grass valley

User's Guide

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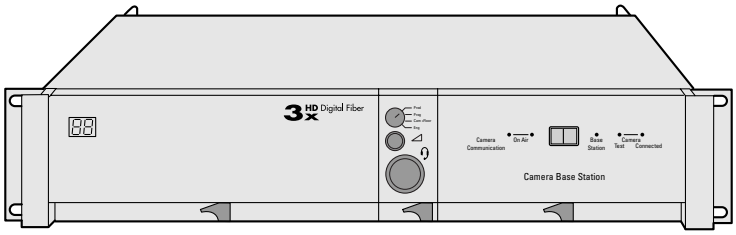

LDK 4583

High-Speed HD Fiber Base Station

Declaration of Conformity

We, Grass Valley Nederland B.V., Kapittelweg 10, 4827 HG Breda, The Netherlands, declare under our sole responsibility that this product is in compliance with the following standards:

- EN60065 : Safety

- EN55103-1: EMC (Emission)

- EN55103-2: EMC (Immunity)

following the provisions of:

a. the Low Voltage directive 2006/95/EC
b. the EMC directive 2004/108/EC

FCC Class A Statement

This product generates, uses, and can radiate radio frequency energy and if not installed and used in accordance with the instructions, may cause interference to radio communications.

It has been tested and found to comply with the limits for a class A digital device pursuant to part 15 of the FCC rules, which are designed to provide reasonable protection against such interference when operated in a commercial environment.

Operation of this product in a residential area is likely to cause interference in which case the user at his own expense will be required to take whatever measures may be required to correct the interference.

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Trademarks

Grass Valley and Infinity are trademarks of Grass Valley, Inc. All other tradenames referenced are service marks, trademarks, or registered trademarks of their respective companies.

Website

Visit the Grass Valley public website to download the latest user's guide updates and additional information about your broadcast product:

www.grassvalley.com

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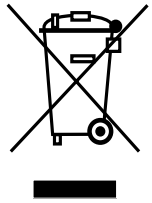
End-of-life product recycling



Grass Valley's innovation and excellence in product design also extends to the programs we've established to manage the recycling of our products. Grass Valley has developed a comprehensive end-of-life product take back program for recycle or disposal of end-of-life products. Our program meets the requirements of the European Union's WEEE Directive and in the United States from the Environmental Protection Agency, individual state or local agencies.

Grass Valley's end-of-life product take back program assures proper disposal by use of Best Available Technology. This program accepts any Grass Valley branded equipment. Upon request, a Certificate of Recycling or a Certificate of Destruction, depending on the ultimate disposition of the product, can be sent to the requester.

Grass Valley will be responsible for all costs associated with recycling and disposal, including freight, however you are responsible for the removal of the equipment from your facility and packing the equipment ready for pickup.

For further information on the Grass Valley product take back system please contact Grass Valley at + 800 80 80 20 20 or +33 1 48 25 20 20 from most other countries. In the US and Canada please call 800-547-8949 or 530-478-4148. Ask to be connected to the EH&S Department. In addition, information concerning the program can be found at:

www.grassvalley.com/environment

Important information

Read these instructions carefully and retain them for future reference.

During installation and operation of this equipment, local building safety and fire protection standards must be observed.

Before connecting the equipment to the power supply of the installation, verify the proper functioning of the protective earth lead.

Whenever it is likely that safe operation is impaired, the apparatus must be made inoperative and secured against any unintended operation. The appropriate servicing authority must then be informed. For example, safety is likely to be impaired if the apparatus fails to perform the intended function or shows visible damage.

Any changes or modifications not expressly approved in this manual could void your authority to operate this equipment.

Cautions and Warnings

Read and comply with the warning and caution notices that appear in the manual.

- Warnings indicate danger that requires correct procedures or practices to prevent death or injury to personnel.
- Cautions indicate procedures or practices that should be followed to prevent damage or destruction to equipment or property.

Warnings

To prevent fire or shock hazard, do not expose the unit to rain or moisture.

To avoid electrical shock, do not remove covers or panels. Refer servicing to qualified personnel only.

In case of an emergency ensure that the power is disconnected.

Use only fuses of the type and rating specified.

Connect the product only to a power source with the specified voltage rating.

The Base Station must always be connected to protective earth. Do not interrupt the protection conductor inside or outside the unit. Do not disconnect the protective earth terminal. Intentional interruption is prohibited and is likely to make the unit dangerous.

To prevent risk of overheating, ventilate the units correctly.

For safety reasons the Base Station must be mounted in a 19-inch rack which has safety covers according to IEC65. When two Base Stations are mounted above each other, the minimum distance between them must be 50 mm or the rack must be force-air cooled.

Fiber-optic transmission units

Laser safety statement (Europe)

Fiber-optic transmission units are classified as a "CLASS 1 Laser Product" according to EN 60825-1, Safety of Laser products. Class 1 laser products are considered safe and do not result in biological hazard if used according to the instructions.

Laser safety statement (US)

Fiber-optic transmission units are classified as a "CLASS 1 Laser Product" according to 21CFR 1040.10 of the US Food and Drug Administration (FDA) Center for Devices and Radiological Health.

Use of controls, adjustments or performance of procedures other than those specified herein may result in hazardous radiation exposure.

To ensure proper use of this product, please read this instruction manual carefully and retain for future reference. Should the unit ever require maintenance, contact an authorized service location.

Fiber-optic cable precautions

Fiber-optic cables and connectors are easily damaged; take the following percautions into account:

- Do not bend the cable beyond the minimum permissible bend range specified for the cable.
- Avoid kinks in the cable.
- Avoid subjecting the cable to a high tension force (even momentarily).
- Do not twist the cable when connecting it to equipment.
- Insert connectors straight and fully into their corresponding sockets.
- In fiber-optic cable systems always put the dust caps on cable and panel connectors immediately after disconnecting a cable. Keep the dust caps clean.

Cleaning fiber-optic connectors

WARNING

Never clean an optical connector attached to a fiber that is carrying light.

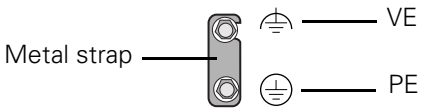
Particles of foreign matter on the tip of a ferrule can have a disabling effect on fiber-optic transmission. Fiber-optic connectors need to be cleaned every time they are mated and unmated; it is essential that fiber-optic users develop the necessary discipline to always clean the connectors before they are mated.

Use a commerially available cleaning kit specifically designed for fiber-optic connectors and follow the manufacturer's instructions carefully.

- The connector sections to be cleaned include the tips and sides of ferrules, the interior walls of alignment sleeves, and the interior and exterior of connector shells.
- For plugs, the interior surfaces of alignment sleeves and the tips of ferrules are to be cleaned with a cleaning stick treated with the appropriate fluid. (Cleaning sticks with a slender design are available that allow alignment sleeves to be cleaned without having to detach them.)
- For jacks, it is important to clean both the tips and sides of the completely protruding ferrules.
- Both the male and female connector shells tend to attract dust and metal particles, so it is important to clean both the insides and outsides.
- The fiber end face and ferrule must be absolutely clean before it is inserted into a transmitter or receiver.
- Mate the connector immediately! Don't let the connector lie around and collect dust before mating.
- Air can be used to remove lint or loose dust from the port of a transmitter or receiver to be mated with the connector. Never insert any liquid into the ports.

Base Station earthing

The rear of the unit has two separate screw terminals for protective earth ⏚ (PE) and video earth ⏚ (VE). These are normally connected by a metal strap.



The protective earth terminal is internally connected to the protective earth conductor of the power cable. In normal circumstances the connection between the protective earth and the video earth should **not** be broken. If required, the central earth connection wire of the studio can be connected to terminal PE in accordance with VDE regulation 0800/part2.

Only if the studio (or OB van) is equipped with separate protective and video earth systems may the metal strap be removed. Under these circumstances the video earth terminal must be connected to the central functional earth potential (video earth) of the studio. This earth potential should have functional protective and noiseless earth (FPE) qualities as stated in the VDE regulation 0800/part2. A low impedance interconnection of both earth conductors must be provided at the central studio earthing point.

Mains lead wiring for UK users

The wires in the mains lead are coloured in accordance with the following code:

GREEN and YELLOW- EARTH

BLUE- NEUTRAL

BROWN- LIVE

As the colours of the wires in the mains lead of this apparatus may not correspond with the coloured markings identifying the terminals in your plug proceed as follows:

- The wire coloured GREEN AND YELLOW must be connected to the terminal on the plug marked with the letter E or by the safety earth symbol ⏚ or coloured GREEN or GREEN AND YELLOW.
- The wire coloured BROWN must be connected to the terminal marked with the letter L or coloured RED.
- The wire coloured BLUE must be connected to the terminal marked with the letter N or coloured BLACK.

Ensure that your equipment is connected correctly - if you are in any doubt consult a qualified electrician.

Chapter 1

Introduction

1.1 Technology

The LDK 4583 High-Speed HD Fiber Base Station is the perfect interface between your HD camera and the rest of your system. The heavy-duty base station provides state-of-the-art technology in a compact package. The high level of modularity guarantees ideal matching with any type of application; you can use the system in a studio or for mobile field production, for HD or for SD production.

The Base Station is only 2U high yet offers full broadcast functionality and quality.The low height means that rack space is saved. Its low power consumption and efficient internal cooling eliminate the need for space between adjacent units. Sliding rails are additionally available for easy access to the back panel. The wings on either side of the back panel protect the connectors from damage, including the hybrid fiber connector. The hybrid fiber connector itself can easily be mounted at different angles to suit all mounting requirements.

Operational controls

You can access the Base Station menu, which contains all operational settings, from an Operational Control Panel. In addition to the operational menu, the installation and service menus can be activated from the Base Station by pressing a switch behind the front panel. The Base Station is compatible with all existing control system components.

1.1.1 High Speed through digital fiber

The HD fiber system allows video transmission at single, double or triple speed and remote control of cameras up to a distance of 4,000 m (13,000 ft) and beyond, using industry standard fiber optic cable. It is based on 30 MHz full-bandwidth 4:2:2 transmission (Y/Cr/Cb components). All video and data signals are transmitted digitally to ensure long cable runs without any loss of quality.

The three HD-SDI phased output connections are used to supply an external harddisk recorder or recording system to obtain exceptional slow motion playback performance. The three HD-SDI phased signals are also combined internally and are output as a standard HD-SDI signal. An HD-SDI monitoring output with menu text overlay is available.

1.1.2 Modular construction

The modular concept makes it easy to expand the functionality by simply adding new modules. Quick exchange of the modules for servicing or the ability to swap modules between Base Stations is another benefit.

External video inputs

The external video input module provides two analog video inputs and loop-through analog outputs. The signal can be PAL or NTSC, and does not need to be clamped. It can also be non-synchronized. The external video input module can be replaced in future by a digital one.

High quality SD outputs

Besides standard high-definition outputs, the Base Station can be optionally equipped with simultaneous high-end SD outputs. This offers ultimate flexibility: produce in SD one day, and in HD the next, or do both simultaneously. The optional LDK 4530/40 High Quality SD module adds three 270 Mb/s SDI outputs.

1.1.3 Audio and intercom

The audio and advanced intercom module provides 4-channel intercom, 2-channel digital audio (AES/EBU compliant) and 2-channel high-quality analog audio from the camera. The audio channels from the camera head are passed to the different outputs via balanced line drivers on the module for clean transparent sound. Both analog audio channels are available as digital outputs on the Base Station. Gain levels can be externally controlled.

In the installation menu of the Base Station, a choice is provided between a 4-wire or a 2-wire intercom system. A 1kHz test-tone generator and voicemail are available. The voicemail stores messages from the Program, Production or Engineering channels for the camera operator.

By adding the engineering intercom module, a 5-channel full-featured intercom is possible. The engineering intercom module provides a 2-channel intercom between camera operator and engineering. The module fits into the front of the unit and facilitates the plugging in of a headset and level adjustment for both ear muffs. It is ideal for a simple intercom facility in a standalone mode of operation, or to expand the 4-channel advanced intercom to a 5-channel intercom.

1.2 Features

- Low height: only 2U high, 19-inch rack unit.
- Flexible due to its modular construction.
- The digital transmission backbone and power module meet the most demanding broadcasting needs.
- 3 channels SD-SDI or HD-SDI return video inputs available.
- Heavy-duty concept with low power consumption, ideal for Outside Broadcast (OB) vans.
- Fiber allows video transmission and remote control of cameras up to a distance of 4,000 m (13,000 ft) and beyond.
- Full camera control via the C2IP Ethernet-based network.
- Two-wire or four-wire intercom compatible with international standards.
- HD and simultaneous high-quality SD outputs (optional).

1.3 Packing/unpacking

Inspect the shipping container for evidence of damage immediately after receipt. If the shipping container or cushioning material is damaged, it should be kept until the contents of the shipment have been checked for completeness and the units have been checked mechanically and electrically. The shipping container should be placed upright and opened from the top. Remove the cushioning material and lift out the contents. The contents of the shipment should be checked against the packing list. If the contents are incomplete, if there is mechanical damage or defect, or if the units do not perform correctly when unpacked, notify your sales or service centre within eight days. If the shipping container shows signs of damage or stress, notify the carrier as well.

If a unit is being returned to for servicing, try to use the containers and materials of the original packaging. Attach a tag indicating the type of service required, return address, model number, full serial number and the return number which will be supplied by your service centre. If the original packing can no longer be used, the following general instructions should be used for repacking with commercially available materials:

1. Wrap unit in heavy paper or plastic.
2. Use a strong shipping container.
3. Use a layer of shock-absorbing material around all sides of the unit to provide firm cushioning and prevent movement inside container.
4. Seal shipping container securely.
5. Mark shipping container "FRAGILE" to ensure careful handling.

Chapter 2

Installation

2.1 Control bus

The Base Stations are each connected to the control network hub or router via an Ethernet cable (straight-through, not cross-over). The OCP 400 operational control panels and, if required the MCP 400 Master Control Panel, are also connected to the Ethernet network via a hub or router.

An OCP 400 operational control panel can also be connected directly to the Base Station using a cross-over Ethernet cable.

The IP address and other options for the Ethernet connection can be set up in the Base Station System menu. These items can also be set up remotely using a network configuration tool such as Grass Valley's NetConfig.

Note

By default the Ethernet connection is set up for automatic IP assignment.

2.2 Power supply

Caution

Connect the Base Station only to a power source with the specified voltage rating. Use only fuses of the type and rating specified.

The Base Station must always be connected to protective earth. Do not interrupt the protection conductor inside or outside the unit. Do not disconnect the protective earth terminal. Intentional interruption is prohibited and is likely to make the unit dangerous.

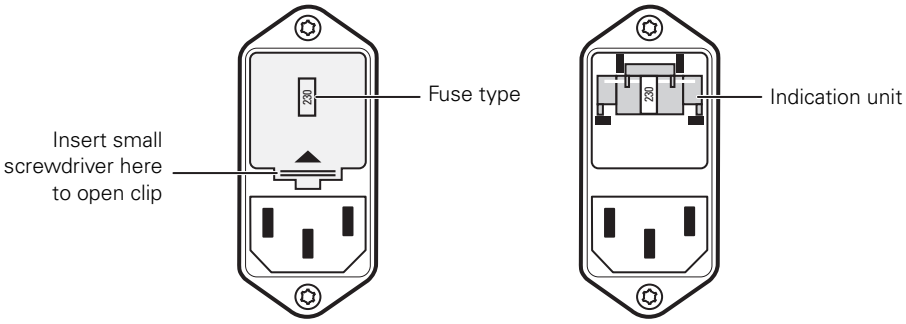
Before connecting your unit to the power supply check the fuse type (230 VAC or 115 VAC) on the IEC power connector at the rear of the Base Station.

If the fuse type shown corresponds to your power supply voltage, connect the power supply for the Base Station to the IEC connector at the rear.

If the fuse type does **not** correspond to your power supply voltage you must change the fuses before connecting the supply as follows:

1. Insert a small screwdriver into the slot above the pins of the IEC connector and unclip the fuse holder unit.
2. Insert you finger under the indication unit and pull it out.
3. Rotate the indication unit 180° so that the correct indication for you voltage supply is displayed at the back of the Base Station (230 or 115).
4. Slide the indication unit securely back into its slot.
5. Insert the appropriate fuses into the alternative fuse holder which is delivered separately with the Base Station (4 AT fuses are 22 mm long and fit into the 230 fuse holder; 10 AT fuses are 32 mm long and fit into the 115 fuse holder). The type of fuse holder is marked on the holder.
6. Slide the fuse holder securly back into the IEC connector until it clips into place.
7. Check again that you have used the correct fuses and that the corresponding indication is shown.
8. Connect the power supply for the Base Station to the IEC connector at the rear.

Figure 2-1. Base Station fuses

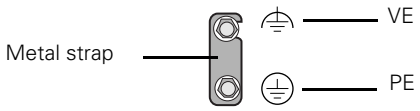


Function	Value
Mains input voltage	230 VAC or 115 VAC
Fuses	4AT (230 VAC) or 10AT (115 VAC)
Mains frequency	47 to 63 Hz
Power consumption	270 Watt (470 VA)

2.2.1 Base Station earthing

The rear of the unit has two separate screw terminals for protective earth ⏚ (PE) and video earth ⏚ (VE). These are normally connected by a metal strap.

Figure 2-2. Base Station earthing



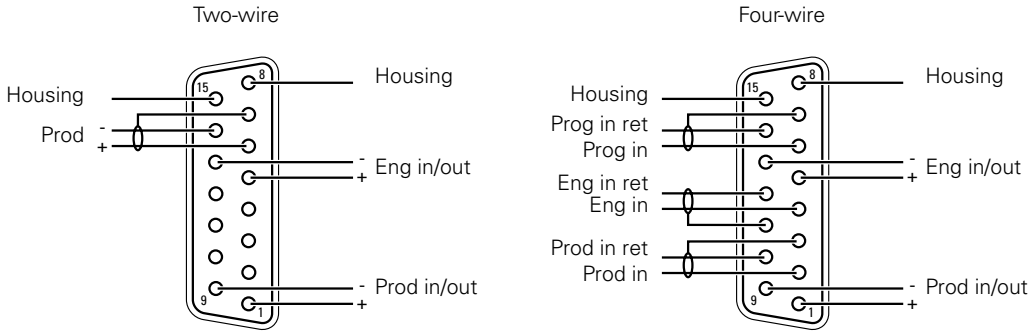
The protective earth terminal is internally connected to the protective earth conductor of the power cable. In normal circumstances the connection between the protective earth and the video earth should **not** be broken. If required, the central earth connection wire of the studio can be connected to terminal PE in accordance with VDE regulation 0800/part2.

Only if the studio (or OB van) is equipped with separate protective and video earth systems may the metal strap be removed. Under these circumstances the video earth terminal must be connected to the central functional earth potential (video earth) of the studio. This earth potential should have functional protective and noiseless earth (FPE) qualities as stated in the VDE regulation 0800/part2. A low impedance interconnection of both earth conductors must be provided at the central studio earthing point.

2.3 Connecting the studio intercom system

Connect the studio intercom system to the rear of the Base Station. The wiring of the panel connector is shown below for two-wire and four-wire systems.

Figure 2-3. Intercom connection



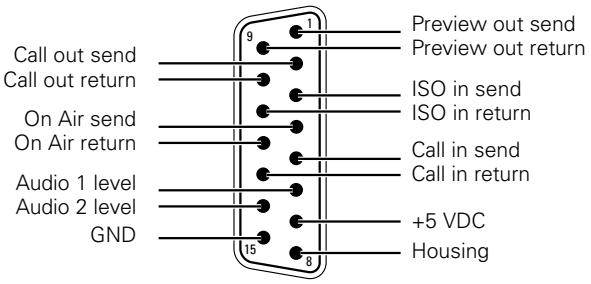
Function	Value
2-wire	
Signal level	0 dBu (RMS)
Load impedance	200 Ω
DC level	40 VDC (max.)

Function	Value
4-wire	
Output signal level	+6 or 0 dBu (RMS) selectable
Output impedance	50 Ω (max.), symmetrical
Input signal level	+6 or 0 dBu (RMS) selectable
Impedance	9 KΩ (min.), symmetrical

2.4 Connecting the studio signalling

Connect the studio signalling system to the rear of the Base Station. The wiring of the panel connector is shown below:

Figure 2-4. Signalling connector



2.4.1 ISO, On Air and Call signals

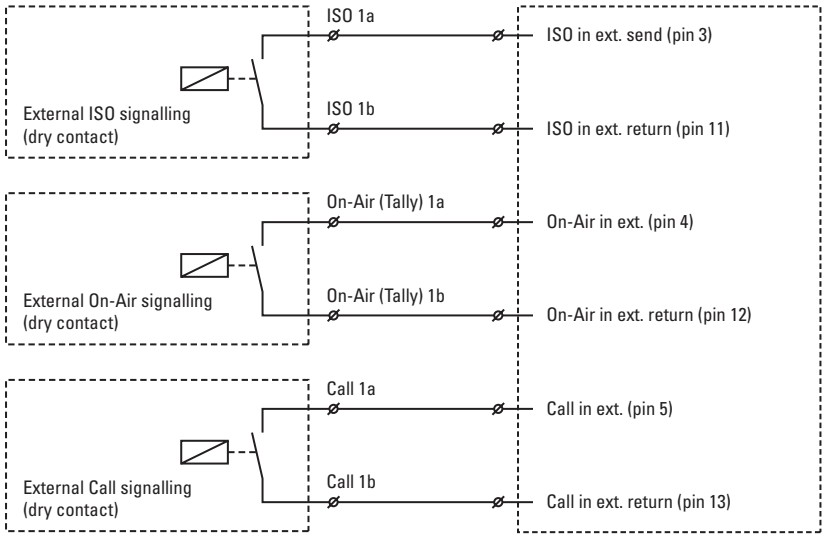
There are several connection methods for the ISO (On Air Yellow), On Air and Call signalling functions: **dry contact**, **common ground**, **voltage level** and **open circuit/voltage level.**

A selection in the SYSTEM > SIGNALLING menu allows you to make the activity state of the function (Active or Inactive) correspond to a particular input signal. There are two leads for each connection - Send and Return.

Function	Send pin	Return pin
ISO	3	11
On Air	4	12
Call	2	10

Dry contact

Figure 2-5. Dry contact



☞ Note

A common return (not ground!) can be used for all three functions (ISO, On Air and Call)

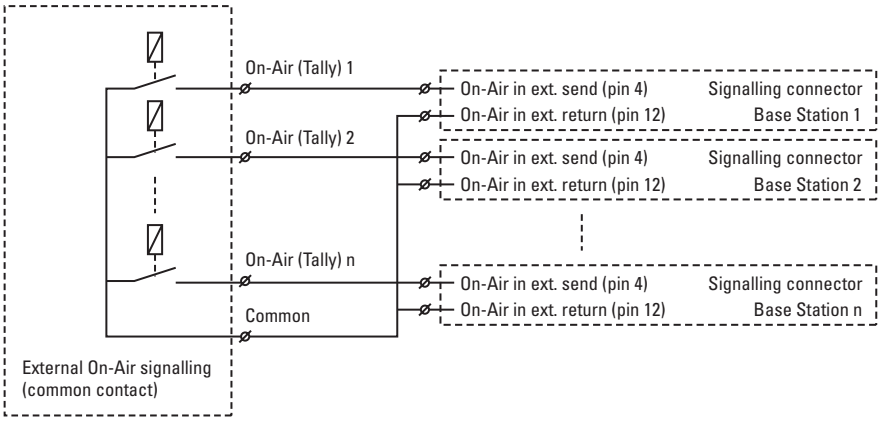
If a contact is closed, the corresponding function is Active or Inactive, depending on the selection the SYSTEM > SIGNALLING menu:

Menu setting	Input is shorted:	Input is open:
LH (low-high)	Function is Active	Function is Inactive
HL (high-low)	Function is Inactive	Function is Active

Dry contact with multiple Base Stations

This is an example of an On Air signalling with multiple Base Station using common contact.

Figure 2-6. Dry contact with common contact



☞ Note

Use either Send or Return only, but do not mix.

If a contact is closed, the corresponding function is Active or Inactive, depending on the selection the `SYSTEM` > `SIGNALLING` menu:

Menu setting	Input is shorted:	Input is open:
LH (low-high)	Function is Active	Function is Inactive
HL (high-low)	Function is Inactive	Function is Active

Common ground

Figure 2-7. Common ground

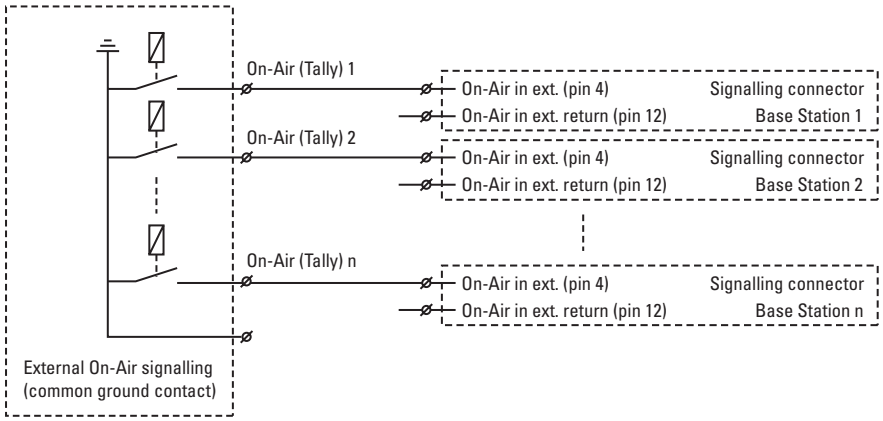
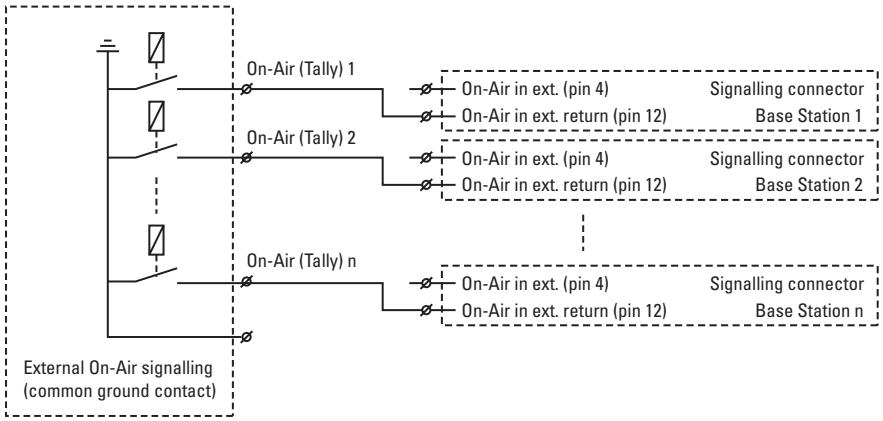


Figure 2-8. Common ground using returns



☞ Note

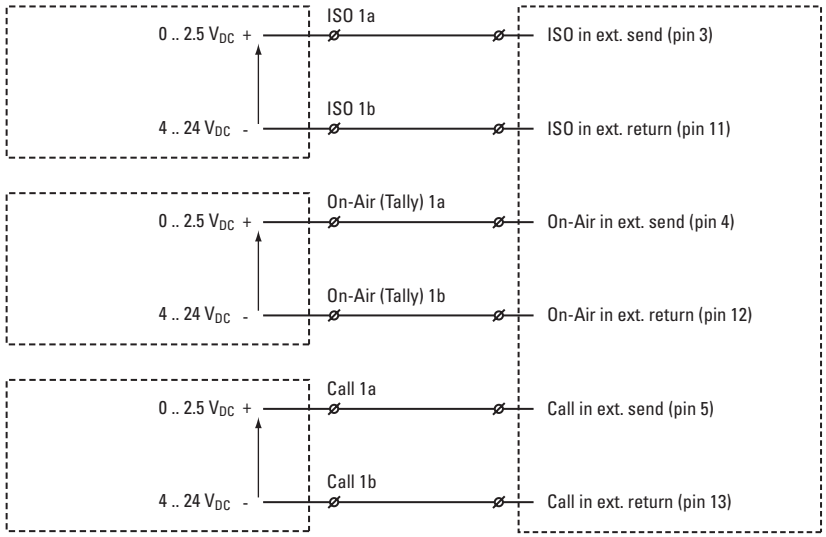
Ensure that a reliable ground coupling exists between the control device ground and the Base Station ground.

If a contact is closed, the corresponding function is Active or Inactive, depending on the selection the `SYSTEM` > `SIGNALLING` menu:

Menu setting	Input is shorted:	Input is open:
LH (low-high)	Function is Active	Function is Inactive
HL (high-low)	Function is Inactive	Function is Active

Voltage level

Figure 2-9. Voltage level

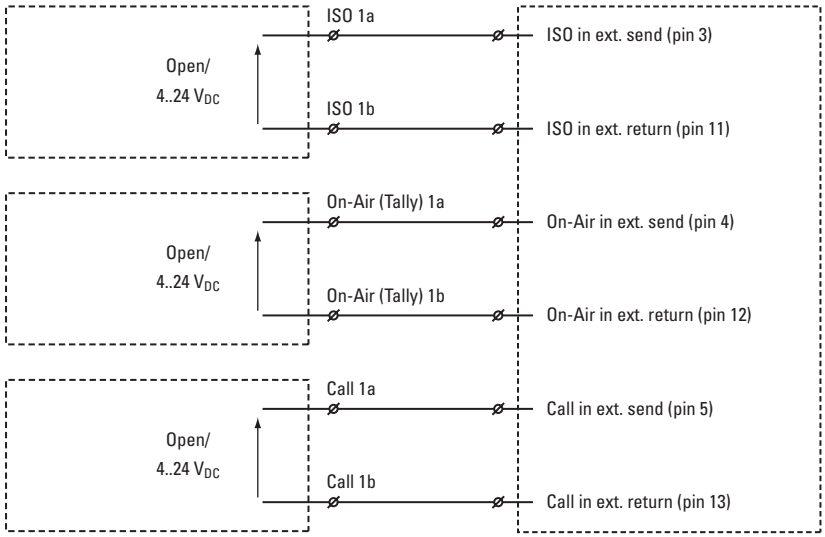

ISO 1a
0 .. 2.5 VDC +
ISO in ext. send (pin 3)
ISO 1b
4 .. 24 VDC -
ISO in ext. return (pin 11)
On-Air (Tally) 1a
0 .. 2.5 VDC +
On-Air in ext. send (pin 4)
On-Air (Tally) 1b
4 .. 24 VDC -
On-Air in ext. return (pin 12)
Call 1a
0 .. 2.5 VDC +
Call in ext. send (pin 5)
Call 1b
4 .. 24 VDC -
Call in ext. return (pin 13)

Apply a DC voltage to the inputs (respect polarity). If the voltage is low (0 to 2.5 VDC), the function is Active (or Inactive). If the voltage is high (4 to 24 VDC) the function is Inactive (or Active). The function state depends on the selection the `SYSTEM` > `SIGNALLING` menu:

Menu setting	Input is 0 to 2.5V:	Input is 4 to 24V:
LH (low-high)	Function is Active	Function is Inactive
HL (high-low)	Function is Inactive	Function is Active

Open circuit/Voltage level

Figure 2-10. Open circuit/Voltage level



Leave the circuit open or apply a DC voltage to the inputs (respect polarity). If the circuit is open, the function is Active (or Inactive). If the voltage is high (4 to 24 VDC) the function is Inactive (or Active). The function state depends on the selection the `SYSTEM` > `SIGNALLING` menu:

Menu setting	Input is open	Input is 4 to 24V
OH (open-high)	Function is Active	Function is Inactive
HO (high-open)	Function is Inactive	Function is Active

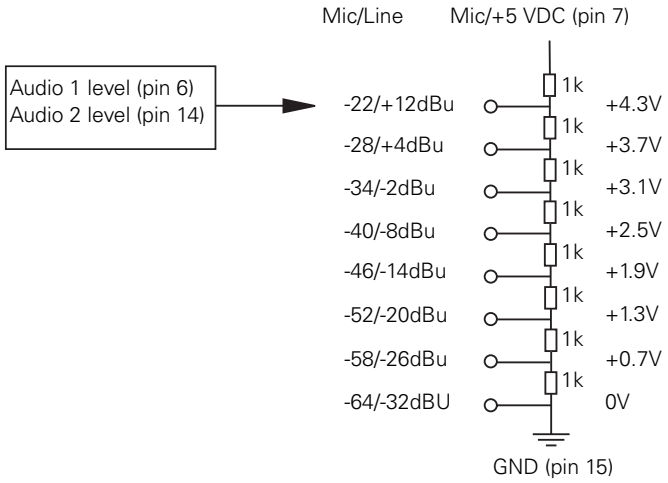
2.5 External audio level control

The camera audio level for channel 1 and 2 can be externally controlled by the base station. In the camera menu, go to the `INSTALL` > `AUDIO` > `AUDIO GAIN MODE` item and select **Ext**.

On the OCP 400, push the **SETUP** button and choose the Cam(era) submenu. Use the **NEXT** button to scroll to the `REM AUDIO` menu and select **Rem**.

Apply a DC voltage to pins 6 and 14 of the signalling connector to control the levels of audio channels 1 and 2 respectively, as shown in the figure below:

Figure 2-11. Audio level control



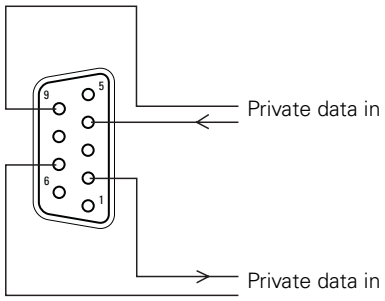
The actual audio level depends on the setting of the selection switches at the back panel of the camera adapter. When Mic is selected, the maximum gain level is -64 dBu, while maximum Line level is -32 dBu.

2.6 Auxiliary connections

2.6.1 Private data

Private data channels can be used for the transmission of serial data via the transmission cable. For example, electronic scriptboard or character data for a video display unit or pan and tilt data can be transmitted to the camera. The input and output signals are available on the auxiliary connectors of the camera and Base Station.

Figure 2-12. Private data on auxiliary connector



Remember that the propagation-delay times are different for different cable lengths, especially if a return signal is involved. At maximum lengths of 2,400 m (7,900 ft) the total delay is at least 25 µs and can be more than 30 µs depending on the type of cable.

The duty cycle difference between input and output is max. 5%.

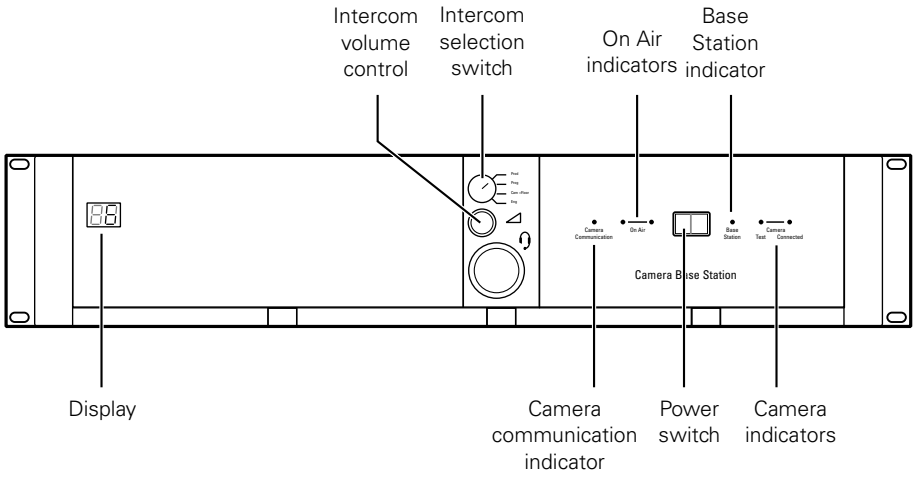
Function	Value
Bitrate	100 kbits/s
Input level	TTL, possible RS-232 ("0"= 0V +/- 0.5V; "1"= 5V +/- 0.5V)
Input impedance	100 kΩ
Output impedance	150 Ω
Max. load	approx. 1 kΩ

Chapter 3

Setup

3.1 Base Station controls and indicators

Figure 3-1. Base Station controls



Control or indicator	Description	
Display	During normal operation the display shows the number of the camera connected to the Base Station. When the set-up control (located behind the left front cover) is activated, the display shows a two letter code to identify the setup function . The display can be switched on or off via the Base Station menu system.	
Intercom volume control	Adjusts the volume of the selected intercom channel being monitored on the connector below.	Only available when the optional LDK 4541 2-channel Engineering intercom module is installed.
Intercom selection switch	Use this switch to select the intercom channel that is monitored on the connector below.	
Camera communication indicator	This green LED lights when the communications between Camera and Base Station are OK.	
On=Air and ISO indicators	The red LED lights when the Camera is On Air. If the Camera is selected as ISO Camera the yellow LED lights.	
Power switch	Switches the power supply to the Base Station on and off. A built-in light lights to indicate that the power is On.	

Control or indicator	Description
Base Station indicator	This green LED lights when the Base Station is operationally ready.
Camera indicators	These bi-colour Test LEDs lights red or yellow to indicate the camera and transmission status.

Refer to the chapter "Maintenance" on page 41 for more detailed information about these indicators.

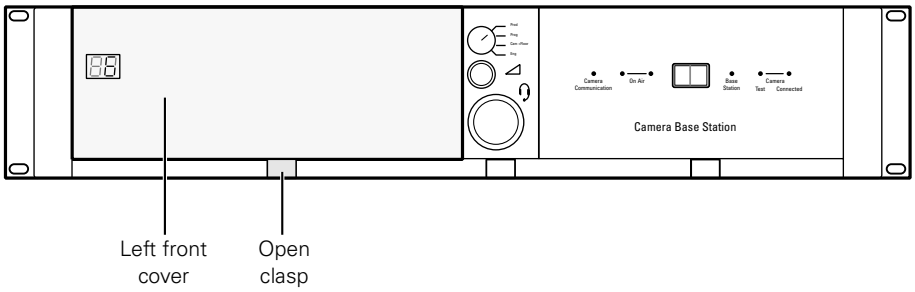
3.2 Setting up the Base Station

The Base Station is set up using either:

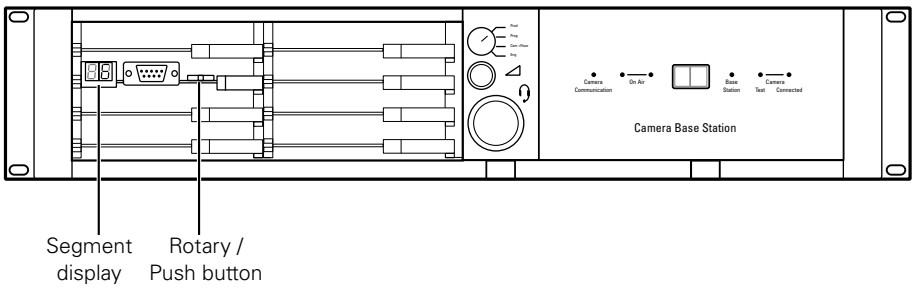
1. The internal Base Station menu behind the front cover of the Base Station or
2. An OCP 400 attached to the Base Station

3.2.1 Using the internal BS menu to set up the Base Station

Push the clasp at the bottom of the left front cover to the left and remove the front cover to access the Rotary/Push button on the Data Board:

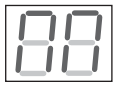


Rock the button to the left or right to select the required item. The display shows the abbreviation of the selected item.



Menu items

There are four items that can be accessed via the internal menu:



System menu

When "NN" is displayed, push the Rotary/Push button twice to enter the System Menu. The Rotary/Push button can be used to navigate through the menu system, however, it is more convenient to use the OCP 400 connected to the Base Station.

☞ **Note**

When accessed from the internal menu, the Base Station user level is set to **Operator**.

Camera number

When "CA" is displayed, push the Rotary/Push button to enter the selection mode. Rock the button to the left or right to select an available camera number. Push the Rotary/Push button to set the new camera number. The Base Station automatically resets and the new camera number is shown in the display.

Subcarrier Phase adjusment

When "SC" is displayed, push the Rotary/Push button to enter the subcarrier adjustment mode. Rock the button to the left or right to shift the subcarrier phase. If you continue to rock the button, the shift change occurs in bigger steps. Push the Rotary/Push button to leave the subcarrier adjustment mode.

☞ **Note**

This item is only available when a reference signal is present.

H-Phase adjustment

When "HP" is displayed, push the Rotary/Push button to enter the H-Phase adjustment mode. Rock the button to the left or right to shift the H-Phase. If you continue to rock the button, the shift change occurs in bigger steps. Push the Rotary/Push button to leave the H-Phase adjustment mode.

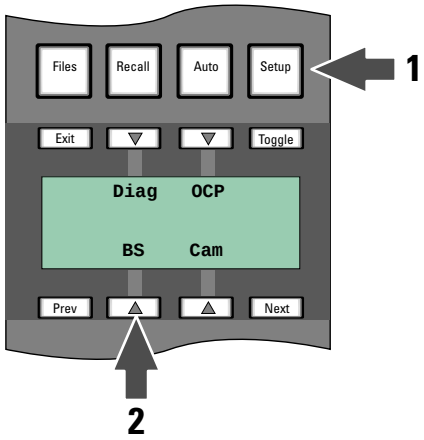
☞ **Note**

This item is only available when a reference signal is present.

3.2.2 Using the OCP 400 to set up the Base Station

The OCP 400 can be used to set up the base station instead of the Rotary/Push button.

1. Push the **Setup Menu** button on the OCP to open the menu.
2. Push the selection button to choose the BS submenu.



The BS submenu appears. Use the **Next** button to view subsequent pages.

Table 3-2. Base Station set-up menu

Menu	Selections	Function	Level	Possible values
BS	MONITORING	Picture monitor selection	S	CVBS, R,G,B, Y, EXT1, EXT2, Y/EXT1, Y/EXT2
	-			
	-			
	MENU	BS internal menu enable	S	
Next	H PHASE	Adjustment H-Phase	B	0..99
	SC COARSE	Adjustment Subcarrier phase (coarse)	B	0, 90, 180, 270
	-			
	SC FINE	Adjustment Subcarrier phase (coarse)	B	0..99
Next	NOTCH LVL	Notch Depth (composite out only)	B	0..99
	NOTCH	Notch function (composite out only)	B	On, Off
	-			
	-			

Select the **MENU** item of the BS menu to access the internal menu of the Base Station. The internal menu appears on the Base Station Text output and CVBS output (if switched on).

Table 3-3. Base Station internal menu

Menu	Selections	Function	Level
BS internal menu	UP*	UP menu	S
	-		
	DOWN*	DOWN menu	S
	SELECT	Select item	S

* Or use the rotary contol on the OCP to move up or down through the menu.

☞ Note

When accessed from the OCP 400, the Base Station user level is set to **Operator**.

3.3 Using the Base Station system menu

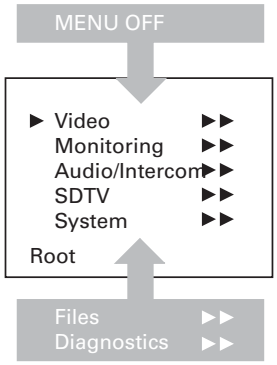
The menu system is used for configuring the base station. As there are a large number of functions and set-up options available, it may require some time for you to become familiar with them all.

The System Menu video signal is available on the Text output of the base station. The System Menu text can also be superimposed on the CVBS output if desired.

3.3.1 Entering the system menu

Use the Rotary/Push button behind the left front cover to control some basic set-up functions and to navigate through the menu system. The system functions of the base station are grouped into menus and sub-menus. Rotate the Rotary/Push button to the left or right to select the Systems Menu. The display shows the abbreviation "NN". Push the Rotary/Push button twice to enter. The Main menu appears on the monitor.

Figure 3-4. Main menu



The main menu screen shows five items and the name of the menu. One more item is hidden but becomes visible when you scroll down. A cursor shows your position in the menu. The Rotary/Push button moves the cursor up and down.

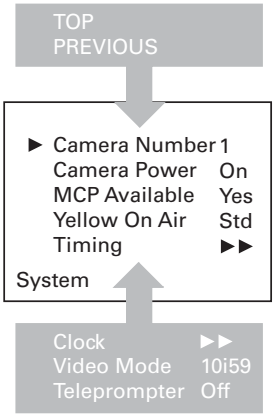
3.3.2 Finding your way

Use the Rotary/Push button to move the cursor through the menu items. If a double arrow (>>) is visible, then pressing the Rotary/Push button brings you one level lower in the menu system. Only five items are visible in each menu. Scroll up or down to see any additional items.

When you first enter a menu (other than the main menu) the cursor is positioned next to the first item. The TOP and PREVIOUS entries are not immediately visible but are located above the first item. Use the Rotary control to scroll up to them.

- Select TOP to bring you back to the MAIN menu.
- Select PREVIOUS to go back to the menu that you were in before the current one.

Figure 3-5. System menu



The SYSTEM menu above shows the items displayed when you first enter the menu and the other items that are available by scrolling up or down with the Rotary control.

3.3.3 Leaving the Systems Menu

If you are deep within the menu structure, follow these steps to leave:

- If necessary move the cursor to the left most column with the Rotary/Push button.
- Scroll upwards until the cursor points to TOP (this is the main menu).
- Press the Rotary/Push button. The cursor now points to the Menu off item of the MAIN menu.
- Press the Rotary/Push button to leave the system menu.

This is the recommended way of leaving the system menu. The menu system disappears after a few seconds when you stop navigating. This delay can be set in the `MONITORING > MENU` menu. However, when you enter the system menu again you enter at the last position of the cursor and not at the top of main menu. To prevent confusion the next time you enter the system menu, it is advisable to leave the system menu by returning to the main menu (TOP) and selecting MENU OFF.

3.3.4 Making changes

To find out where to change a function, consult the List of System Menu Functions at the end of this section to find out under which menu group or subgroup the function is located. If the cursor points to an item (and there are no double arrows to indicate a sub-menu) then the item pointed to has a value. The value can be:

- a toggle value (only two values)
- a list value (more than two values)
- an analogue value (variable from 00 to 99)
- or unavailable (---).

If the value is unavailable it cannot be changed. This is indicated by three dashes (---). This can occur, for example, when a function is switched off. The analogue values associated with that function are then unavailable. If there are only two values associated with the function, then pressing the Rotary/Push button toggles between these two values. If a value is displayed next to a function that is one of several possible values, then pressing the Rotary/Push button places the cursor in a list menu indicating the value currently selected. Use the Rotary/Push button to point to a new value.

Press the Rotary/Push button to return the cursor to the function list. If an analogue value is displayed next to a function name, then pressing the Rotary/Push button places the cursor in front of the value and the Rotary/Push button is used to change the analogue value. Press the Rotary/Push button to return the cursor to the function list.

3.3.5 Using the Recall File to undo changes

If you make changes to the settings in the Systems menu and you decide not to keep them, use the Recall File function to recall a standard or stored set of values for the parameters. These files are available in the FILES menu.

3.3.6 Base Station user levels

The menu items are divided into two user levels. The operator level (O) is default accessible. Menu items with user level Install (I) are only accessible if the menu level is set to **Install**. To enter the Install level proceed as follows:

1. Enter the menu.
2. Navigate to the `MONITORING` > `MENU` > `MENU LEVEL` item.
3. Set the Menu level to **Inst**.

The purpose of the user levels is to restrict the set of functions which can be changed by whoever is using the Base Station. In this way a the danger of the operator accidentally changing critical functions while shooting is reduced.

The chapter "Menu structure and contents" on page 49 indicates which functions are available at each user level.

Note

When accessed from the internal BS menu, the Base Station user level is set to **Operator** while the user level is set to **Install** when accessed from the OCP 400.

3.3.7 Video menu - special features

Auto lighting

The Auto Lighting item of the the video menu compensates for variations in the frequency of the power supply used for gas discharge lamps (fluorescent or HMI lighting). The frequency of power supply generators can vary from the nominal value. This variation affects the lighting which in turn affects the colour balance. If camera system and lighting are supplied by the same power source, then the base station auto lighting function can automatically adjust the exposure to follow the variations and maintain a constant colour balance. This correction only works when the camera exposure time is set to the 50 Hz or 60 Hz position.

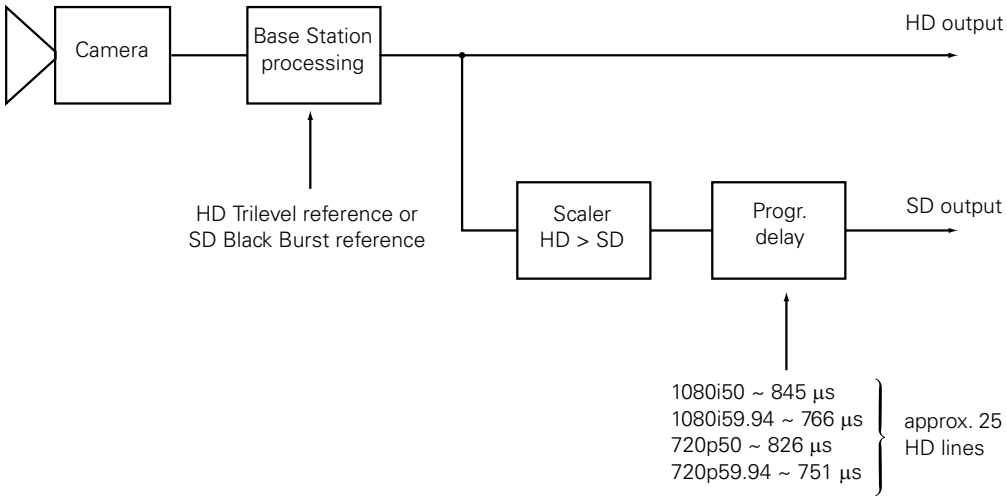
Gain adjustment

The Gain Adjustments item of the the video menu is a special item. It combines menu items from various other menus to help you when you are adjusting the gain. It should only be used when carrying out the gain adjustments on the Sync/Encoder board in conjunction with the procedure given.

3.4 Setting up reference and timing

3.4.1 Output signal processing

The base station can be synchronized with HD Trilevel or SD Black Burst. Both references can be adjusted to match the SD and HD output signals. This is an overview of the base station output signal paths:



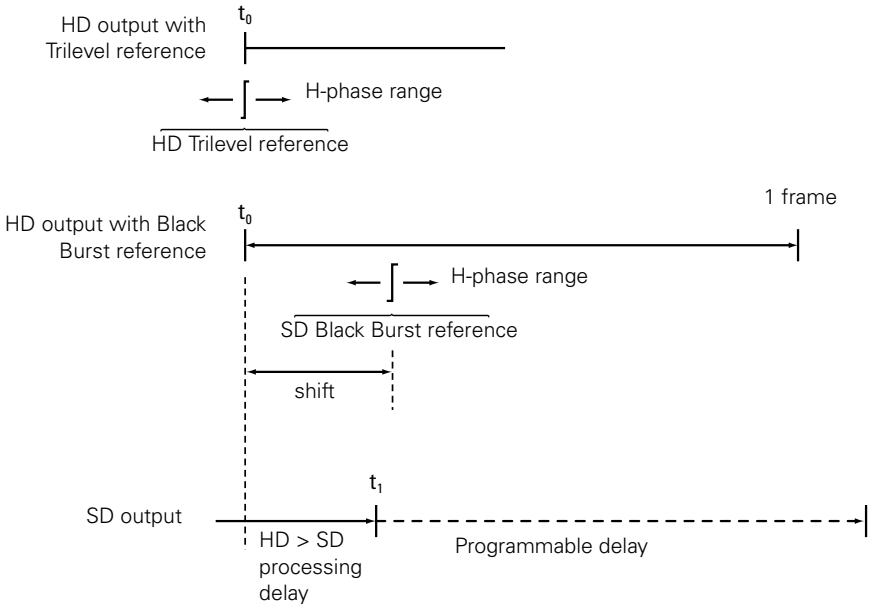
The default settings for the base station reference signals are:

- The first reference is HD Trilevel: the HD output is in time with the HD Trilevel while the SD output signal is delayed.
- The second reference is SD Black Burst: the SD output is in time with the SD Black Burst while the HD output signal is advanced.

☞ Note

There is always a processing delay in the SD output with respect to the HD video outputs.

3.4.2 Adjustment procedure for HD timing



Tip

If HD Trilevel reference is used, the HD output is in sync with the HD Trilevel reference. A timing offset can be set with the SYSTEM > TIMING > H PHASE COARSE and H PHASE COARSE items of the base station menu.

HD output with Black Burst reference

The SD output is in sync with the Black Burst reference. The HD output signal is ahead in time with respect to the Black Burst reference. The HD signal can be shifted with respect to the Black Burst reference, until it is in time with the HD output. The delay between HD and SD outputs remains the same after this adjustment.

1. Enter the base station menu in service mode:
   MONITORING > MENU > MENU LEVEL > INST > SERVICEMODE > EXEC > YES
2. Adjust the Black Burst timing with the following items:
   SYSTEM > TIMING > SHIFT > PIXEL HIGH, PIXEL LOW, LINES HIGH, LINES LOW

Note

This adjustment must be done for each video mode. The last setting for each of these modes will be memorized.

3.4.3 Adjustment procedure for SD timing

The SD output is delayed with respect to the HD output. The SD output can be further delayed until both outputs are synchronous, but shifted over a single frame. The adjustment of the delay ranges from the minimal processing time to more than 1 frame.

1. Enter the base station menu in service mode:
   MONITORING > MENU > MENU LEVEL > INST > SERVICEMODE > EXEC > YES
2. After factory delivery there is a fixed minimum delay between HD and SD outputs:
   SDTV > TIMING > COMP
3. Set the SDTV Timing to Variable:
   SDTV > TIMING > VAR
4. Adjust the SD output delay using the following items:
   SDTV > TIMING > SYNC SHIFT PIXELS and SHIFT LINES

Note

This adjustment must be done for each video mode. The last setting for each of these modes will be memorized.

Note

The CVBS viewing output is a non-standard output and the SD output delay adjustment does not apply to this output.

Tip

HD-Trilevel sync does not contain 4-field (NTSC) or 8-field (PAL) sequence information and therefore will be random. If this is required Black Burst reference should be used.

3.5 Intercom set up

The studio camera systems offer extensive intercom facilities between cameraman, tracker (floor man), Base Station and studio. To help you set up and operate the intercom system, the following controls are available:

- Base Station menu system
- Camera head menu system
- Base Station front panel selection switch (optional)
- Camera head adapter rear panel
- Camera head switches

When setting up a system it is usually more convenient to use an OCP 400 to select your preferences in both the Base Station and camera head menu systems.

☞ Note

For a fully-featured intercom system, the Base Station must be fitted with an LDK 4540/10 2 channel audio & 2/4-wire intercom module and an LDK 4541/10 2 channel Engineering intercom module, both of which are optionally available. If either of these modules is absent, the associated features outlined below are not available.

3.5.1 Base Station - studio interface set-up

A four-wire or a two-wire studio system can be connected to the Base Station. In the Base Station `AUDIO` > `INTERCOM` menu, select the Wire Mode for engineering (ENG), production (PROD) and programming (PROG). By default these values are set to four-wire.

Isolate

The isolate function completely disconnects the Base Station intercom from the studio system. The function can be switched locally or remotely via the OCP 400.

Levels

In the four-wire mode the menu gives you a choice of either a 0dBu or a +6dBu signal level. In the two-wire mode this level is set to 0dBu.

- Set the input and output intercom levels for the PROD and ENG channels. The range is 00 to 99; default is 50.
- Set the input level for the PROG channel.
- Set the levels for the sidetone in a two-wire system in this menu.

3.5.2 Base Station headset set-up

☞ Note

The headset facilities are only available on Base Stations fitted with the LDK 4541/10 2 channel Engineering intercom module which is optionally available.

A headset connected to the front of the Base Station is set-up via the AUDIO > INTERCOM menu of the Base Station using the ENG headset submenu. In this menu you can select a 12 VDC phantom supply for the headset microphone and set the microphone level to 0 dB or +20 dB.

The cameraman microphone signal and the tracker (floor) microphone signal can be individually switched on for the headset and the levels for each can be set. You can switch on a sidetone from the Base Station microphone and set its level.

The Base Station microphone signal is added to the ENG channel. Use the MIC ENG-OUT function in the menu to send it to the studio engineering channel. Use the MICTOENG-CAM function to send it to the camera.

Operation

The signal to the headset is controlled with a switch in the front of the Base Station which selects the intercom signal to be heard in the Base Station headset. The choices are:

- PROD (production)
- PROG (programming)
- CAM+FLOOR (cameraman and tracker)
- ENG (engineering)

If CAM+FLOOR is selected, the signal that is heard depends on the values set in the ENG Headset submenu for the CAMERAMIC and TRACKERMIC signals in the AUDIO > INTERCOM menu of the Base Station.

☞ Note

If you have selected to operate a bi-directional private data channel between the Base Station and the camera in the AUDIO > INTERCOM menu of the Base Station, then the tracker microphone signal is not available in the Base Station and the Program signal is not available in the camera.

3.5.3 Voice mail

Voice Mail is an intercom message storage function.

☞ Note

Voice mail is only available if the AUDIO > INTERCOM > INTERCOM > CALL item is set to **voice**.

Recording

Recording starts automatically at the start of a message. A new message erases the previous recorded message. The maximum message length is 16 seconds. Longer messages are recorded in a retroloop. Only the last 16 seconds are available for playback. Select the intercom channels to be recorded via the Base Station menu items
AUDIO > INTERCOM > INTERCOM > VOICE MAIL > RECORD ENG, PROD and PROG.

☞ Note

The voice mail box can only contain one message. If voice mail recording starts from an other intercom channel the previous message is erased.

Listening to the message

Push the camera call button to start playing out the recorded voice mail to the camera headset. Push the call button again to stop playing the voice mail message.

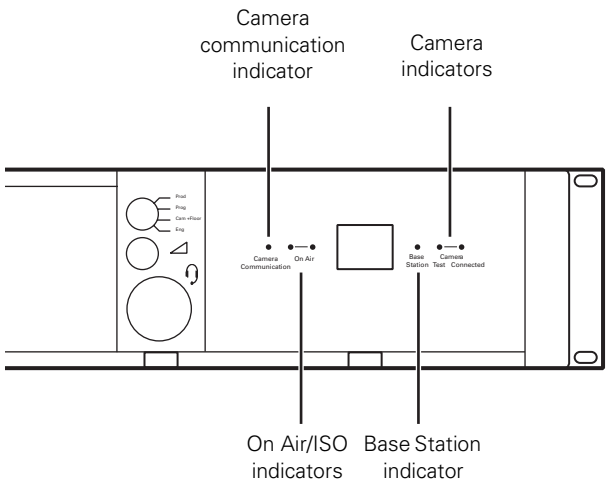
Chapter 4

Maintenance

4.1 Diagnostics

4.1.1 Base Station indicators

Figure 4-1. Base Station indicators



Camera communication indicator

This green LED lights when communication between camera and Base Station is OK.

On Air/ISO indicators

The red On Air LED lights when the camera is On Air. The yellow LED light when the camera is selected as ISO camera.

Base Station indicator

This green LED lights when the Base Station is operationally ready.

Camera Test indicator

This bi-colour LED lights red or yellow to indicate the Camera and transmission status:

- Red lights continuously – cable short circuit OR an interrupted cable core. On the OCP 400, the Cable LED (red) lights continuously.
- Red flashes – Cable open circuit (no camera is connected). On the OCP 400, the Cable LED (red) flashes.
- Yellow – Camera power was switched off from the OCP 400 or MCP 400.

Camera Connected indicator

This green LED lights when the camera is connected (and camera power is not switched off by the OCP 400, MCP 400 or Base Station menu)

Communication indicator	Camera Test indicator	Cam Connected indicator	Remark
off	off	green	Camera power is switched off by the camera power switch.
off	yellow	off	Camera power is switched off by the OCP 400, MCP 400 or BS menu.

4.1.2 Fiber transmission diagnostics

First order diagnostics are available in both camera and base station menus. They are also available on the control panels (OCP 400, MCP 400). The set of diagnostic information contains four items (two items per direction: CAM –> BS and BS –> CAM):

- Transmission status: this indicator provides a value of the optical power level, to inform the user whether the optical attenuation level is acceptable or not. This status indication has four values: OK, Critical, Error, No Signal
- Optical margin level: This item indicates the guard before the connection is in error range. The unit of this indication is dB.

The following table shows the status indications and the values that correspond with these indications:

Status	Power (mW)	Power (dBm)	Margin (dBm)	Description
OK	> 0.040	> -14	18	Fiber transmission is ok
Critical	0.015 .. 0.040	-18 .. -14	18	Signal level is critical but the system will work.
Error	0.005 .. 0.015	-14 .. -23	18	Signal level is not OK: a working system is not guaranteed.
No signal	< 0.005	< -23	18	No signal received.

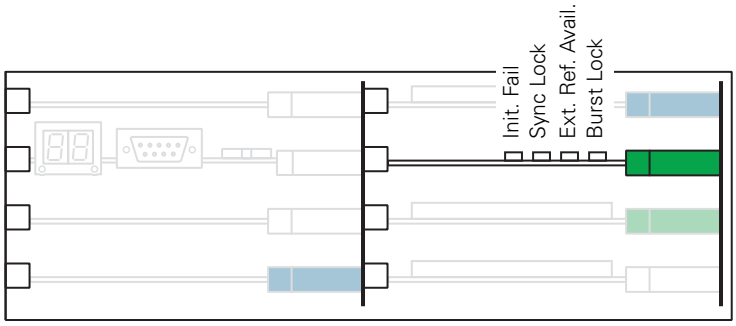
☞ Note

The power/margin indicator is refreshed every one or two seconds. However, a full signal loss will be shown directly.

4.1.3 Sync/Encoder HD board diagnostics

The LED indicators on the Sync/Encoder board show the status of the board and the signal locking as follows:

Figure 4-2. Sync/Encoder HD board

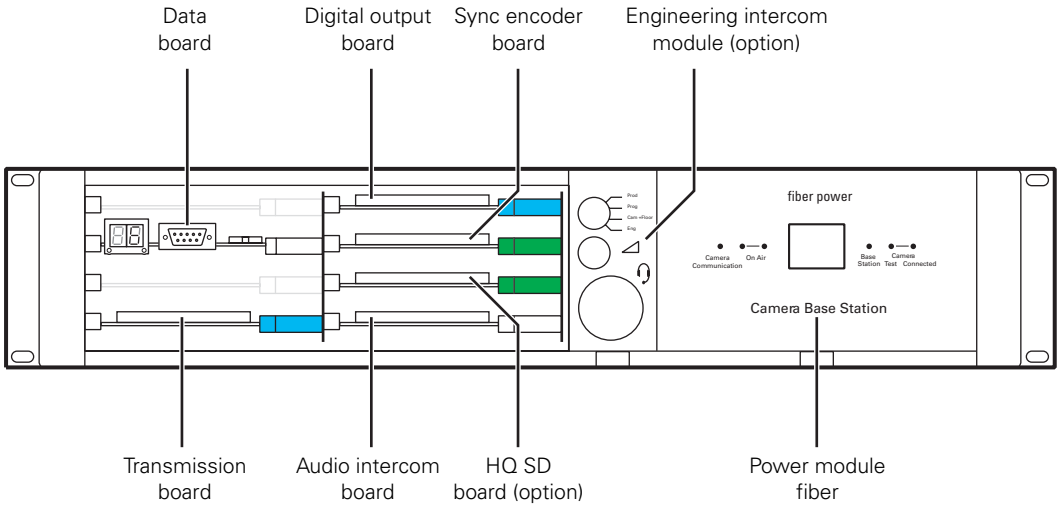


Indicator	Description
Init. Fail	Lights (red) when a configuration or initialisation error occurs or when the bus clock or video synchronization pulses are missing.
Sync Lock	Lights (green) when horizontal and vertical lock are OK.
Ext. Ref. Avail.	Lights (green) when an external synchronization signal is present.
Burst Lock	Lights (green) when the subcarrier/H-phase lock is OK.

4.2 Replacements

4.2.1 Board locations

Figure 4-3. Base Station board locations

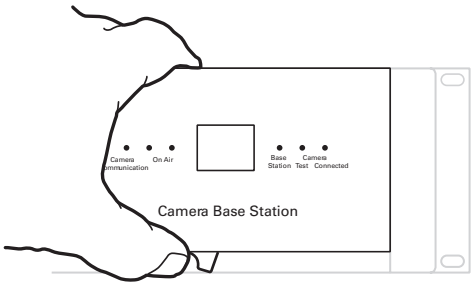


4.2.2 Replacing the power unit

Removing the power unit

- Loosen the screw at the rear of the power unit.
- With your thumb push up the lever, as shown below, and pull the power unit out of the Base Station.

Figure 4-4. Removing the power unit

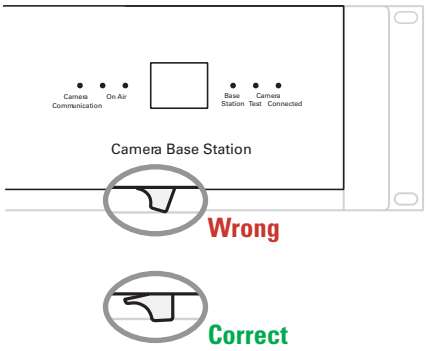


Installing the Power Unit

- Put the power unit into the guides and push until the lock clicks.
- Check that the power unit is correctly locked.
- Tighten the screw at the rear of the Power Unit.

WARNING
Make sure that the power unit is firmly placed and that the locking lever is in the correct vertical position as indicated below.

Figure 4-5. Locking the power unit

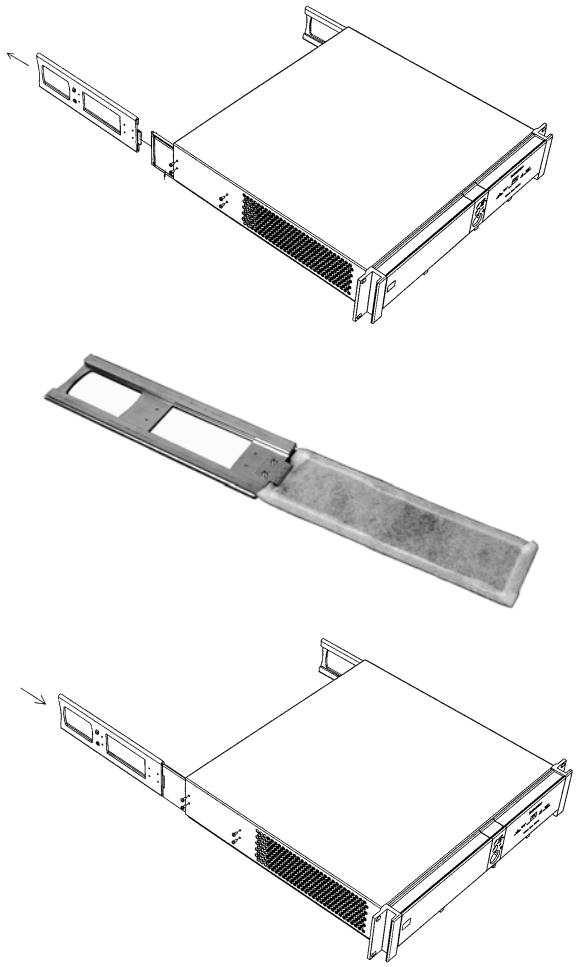


4.2.3 Replacing dust filters

Side-inlet

1. Remove 4 screws.
2. Slide back support with dust filter out of base station.
3. Remove dust filter.
4. Place clean dust filter in back support.
5. Slide back support with dust filter into base station.
6. Fix support with 4 screws.

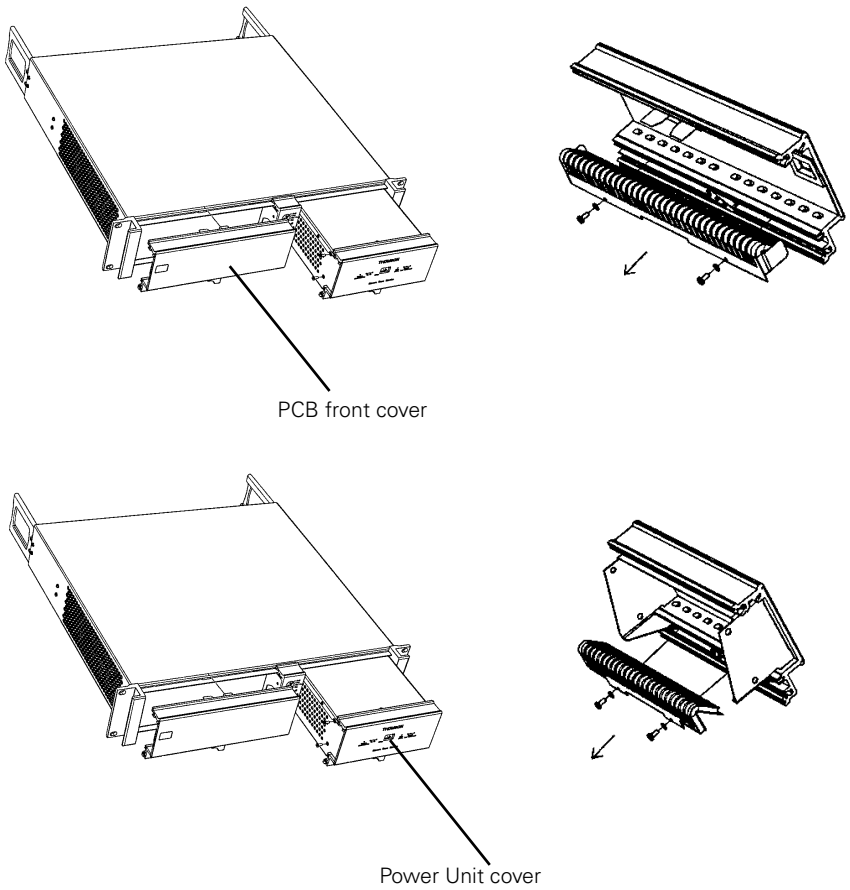
Figure 4-6. Replacing side dust filters



Front-inlet

1. Remove PCB front cover.
2. Remove dust filter.
3. Place clean dust filter.
4. Put back PCB front cover.
5. Remove front cover Power Unit.
6. Remove dust filter.
7. Place clean dust filter.
8. Return front cover Power Unit to its position.

Figure 4-7. Replacing front dust filters



Chapter 5

Menu structure and contents

5.1 Menu structure

The structure of the main menus and their submenus are shown on the following pages. The first column shows the user level: Install ("I") or Operator ("O"). You only see menu functions whose user level is equal to or less than the user level set on your unit. Where appropriate, the default value of the function in the standard factory file is shown after the function.

5.1.1 Top menu structure

	Video menu	>>
	Monitoring menu	>>
	Audio/Intercom	>>
	SDTV menu	>>
	System menu	>>
	Files menu	>>
	Diagnostics menu	>>

Video menu - contains those functions which affect the picture quality.

Monitoring menu - contains the functions which determine how items in the video monitor are displayed.

Audio/Intercom - contains those functions which control various aspects of audio and intercom.

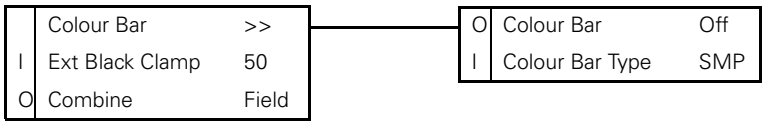
SDTV menu - settings related to the SDTV outputs of the Base Station.

System menu - contains functions that are used to set up the general configuration and for carrying out adjustments and calibrations of the Base Station.

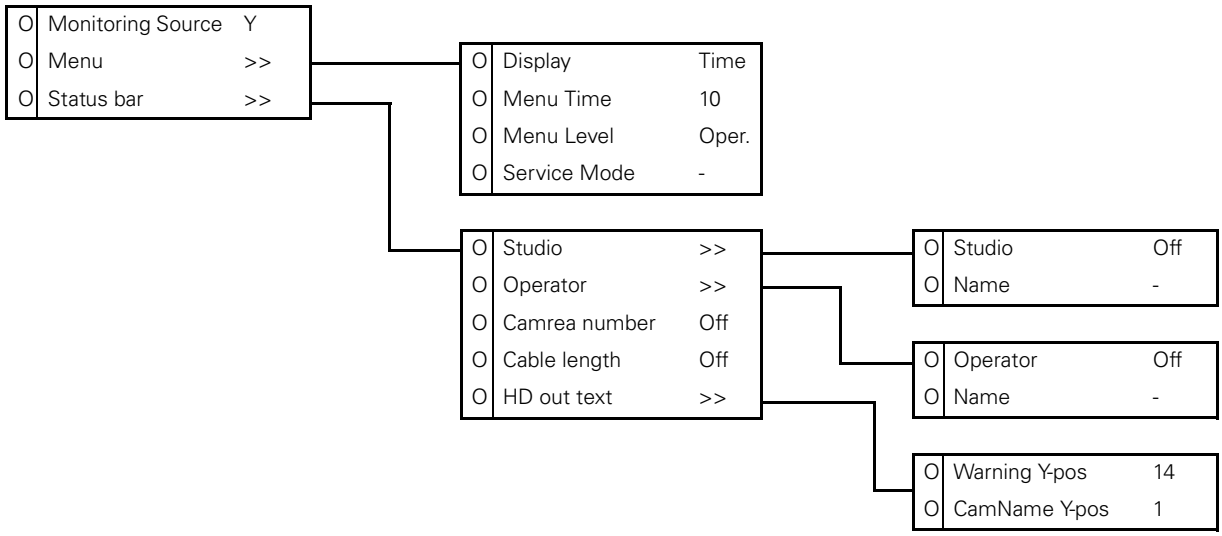
Files menu - this menu allows values to be stored in system and operator files, and allows these files to be recalled as required.

Diagnostics menu - is designed to provide information on the current status of the Base Station.

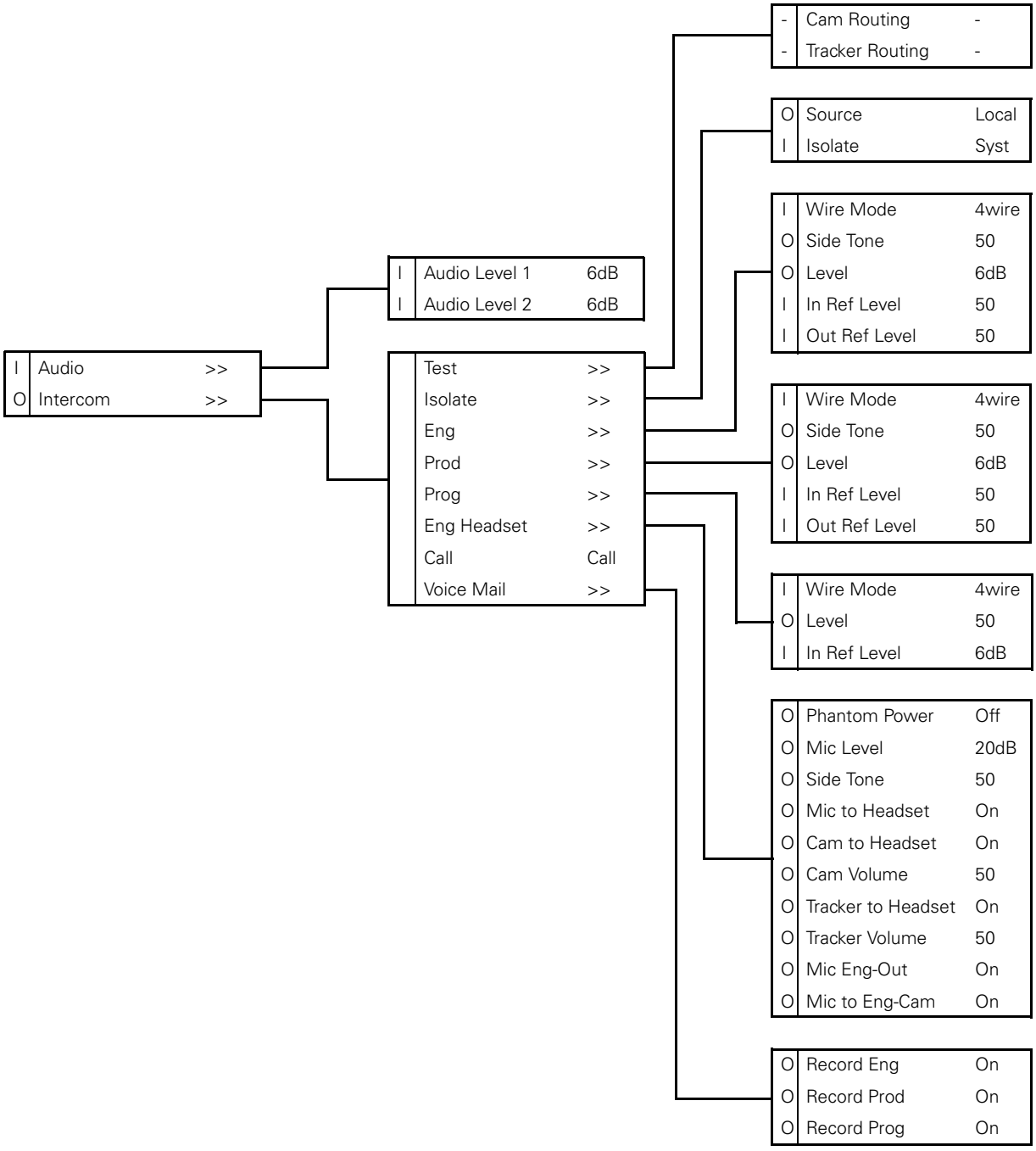
5.1.2 Video menu structure



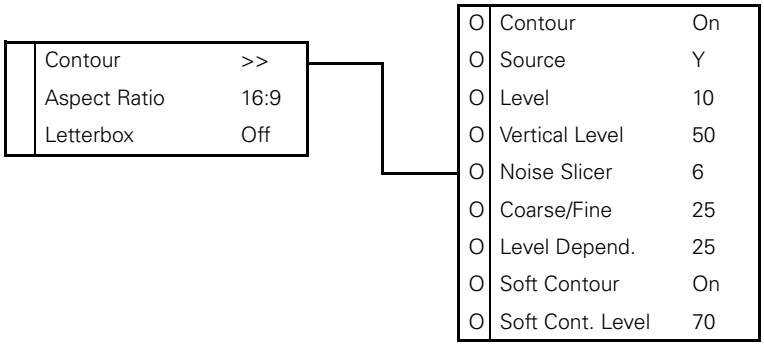
5.1.3 Monitoring menu structure



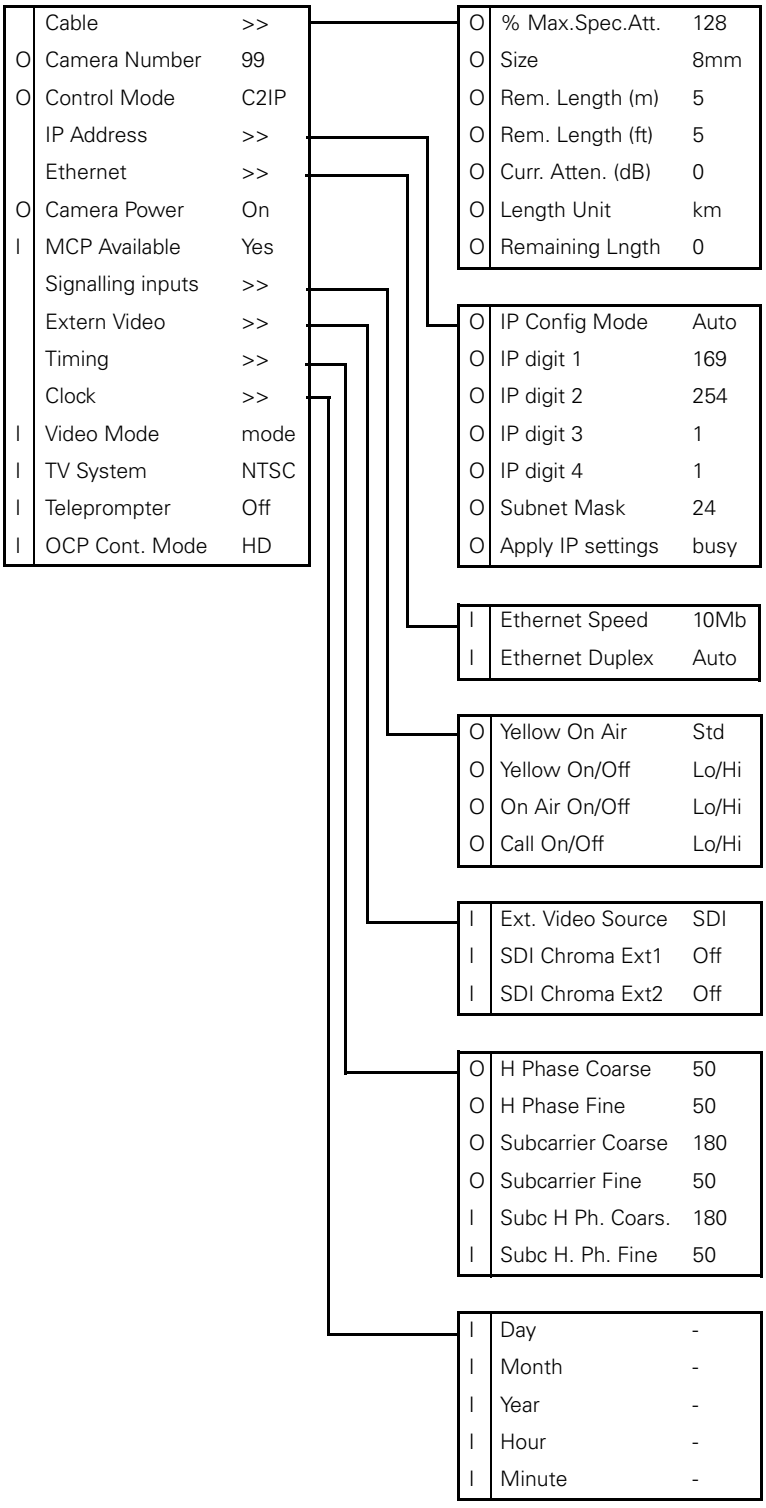
5.1.4 Audio/Intercom menu structure



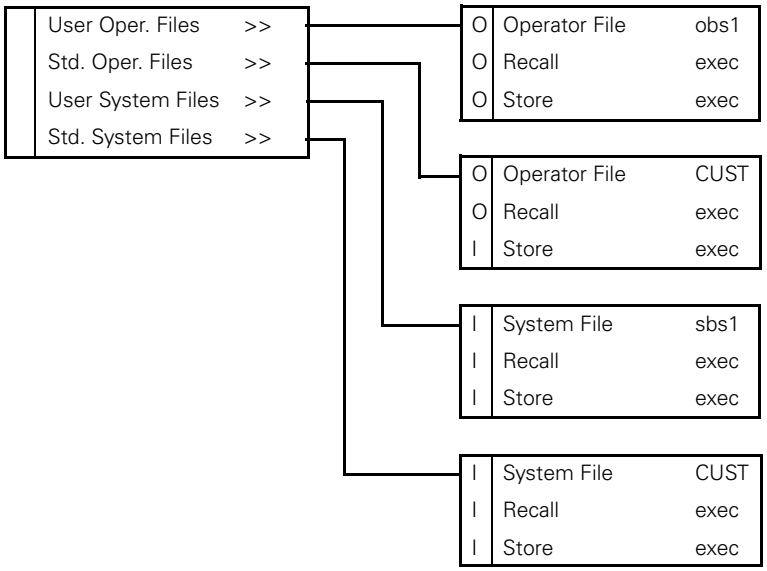
5.1.5 SDTV menu structure



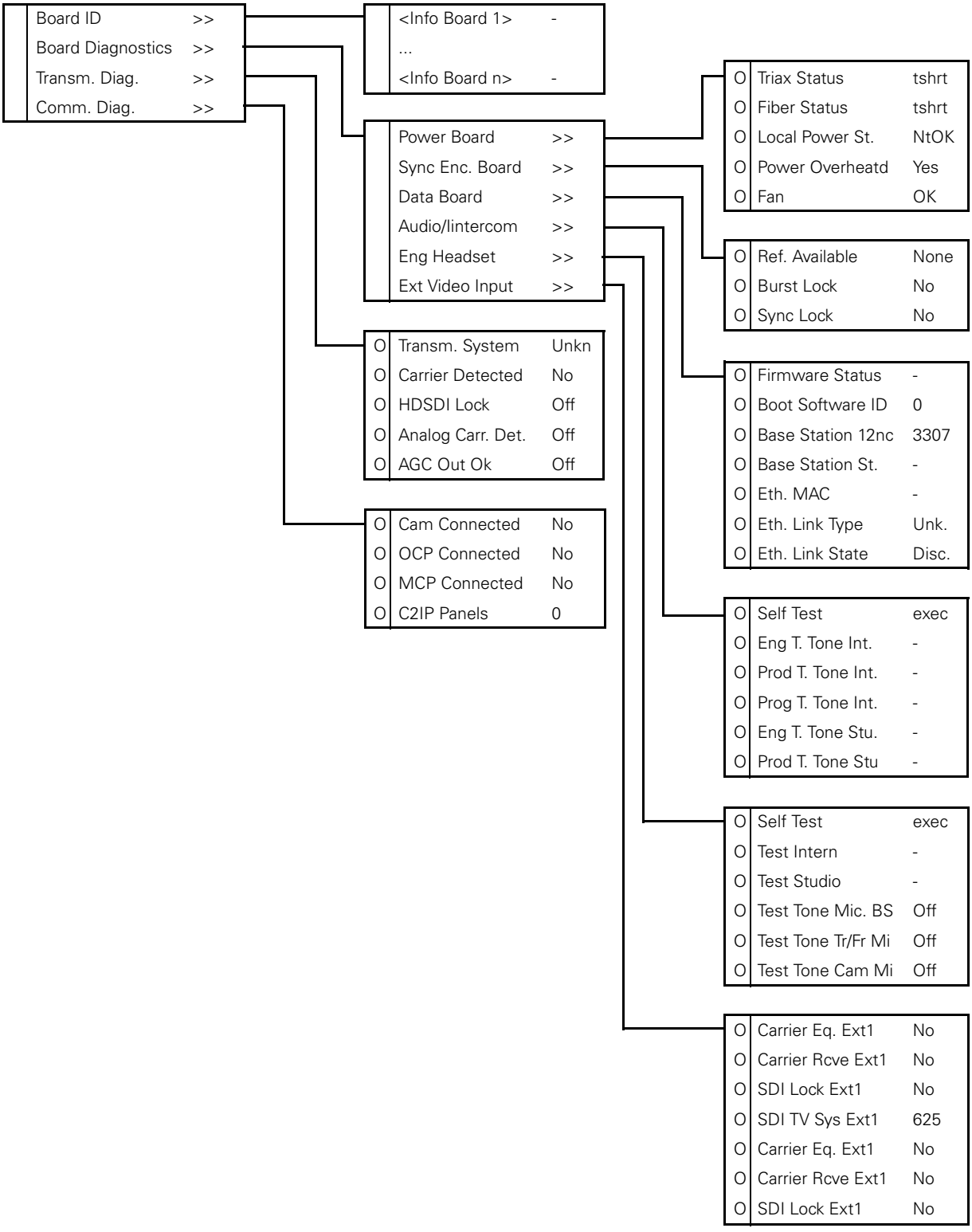
5.1.6 System menu structure


Cable >>
O Camera Number 99
O Control Mode C2IP
IP Address >>
Ethernet >>
O Camera Power On
I MCP Available Yes
Signalling inputs >>
Extern Video >>
Timing >>
Clock >>
I Video Mode mode
I TV System NTSC
I Teleprompter Off
I OCP Cont. Mode HD
O % Max.Spec.Att. 128
O Size 8mm
O Rem. Length (m) 5
O Rem. Length (ft) 5
O Curr. Atten. (dB) 0
O Length Unit km
O Remaining Lngth 0
O IP Config Mode Auto
O IP digit 1 169
O IP digit 2 254
O IP digit 3 1
O IP digit 4 1
O Subnet Mask 24
O Apply IP settings busy
I Ethernet Speed 10Mb
I Ethernet Duplex Auto
O Yellow On Air Std
O Yellow On/Off Lo/Hi
O On Air On/Off Lo/Hi
O Call On/Off Lo/Hi
I Ext. Video Source SDI
I SDI Chroma Ext1 Off
I SDI Chroma Ext2 Off
O H Phase Coarse 50
O H Phase Fine 50
O Subcarrier Coarse 180
O Subcarrier Fine 50
I Subc H Ph. Coars. 180
I Subc H. Ph. Fine 50
I Day -
I Month -
I Year -
I Hour -
I Minute -

5.1.7 Files menu structure



5.1.8 Diagnostics menu structure


Board ID >>
Board Diagnostics >>
Transm. Diag. >>
Comm. Diag. >>
<Info Board 1> -
...
<Info Board n> -
Power Board >>
Sync Enc. Board >>
Data Board >>
Audio/Iintercom >>
Eng Headset >>
Ext Video Input >>
O Transm. System Unkn
O Carrier Detected No
O HDSDI Lock Off
O Analog Carr. Det. Off
O AGC Out Ok Off
O Cam Connected No
O OCP Connected No
O MCP Connected No
O C2IP Panels 0
O Triax Status tshrt
O Fiber Status tshrt
O Local Power St. NtOK
O Power Overheatd Yes
O Fan OK
O Ref. Available None
O Burst Lock No
O Sync Lock No
O Firmware Status -
O Boot Software ID 0
O Base Station 12nc 3307
O Base Station St. -
O Eth. MAC -
O Eth. Link Type Unk.
O Eth. Link State Disc.
O Self Test exec
O Eng T. Tone Int. -
O Prod T. Tone Int. -
O Prog T. Tone Int. -
O Eng T. Tone Stu. -
O Prod T. Tone Stu -
O Self Test exec
O Test Intern -
O Test Studio -
O Test Tone Mic. BS Off
O Test Tone Tr/Fr Mi Off
O Test Tone Cam Mi Off
O Carrier Eq. Ext1 No
O Carrier Rcve Ext1 No
O SDI Lock Ext1 No
O SDI TV Sys Ext1 625
O Carrier Eq. Ext1 No
O Carrier Rcve Ext1 No
O SDI Lock Ext1 No

5.2 Menu contents

All items in the table are visible at the install user level. However, if an item is not relevant it is not shown.

The *Oper* in the Level column indicates that this item is visible at the Operator user level; the *Inst*all indicates that this item is visible at the Install user level.

The *Scene* in the File column indicates that the value of this item is stored in the Scene file; the *Sys* indicates that the value of this item is stored in the System file; the *Oper* indicates that the value of this item is stored in the Operator file.

In the Values column, the default values of the item are shown in **bold**.

5.2.1 Video menu

Menu item	Values	Description	Level	File
Colour Bar				
Colour Bar	On, **Off**	Turns colour bar on or off (when no camera signal is present/detected)	Oper	Scene
Colour Bar Type	**SMPTE-219**, SMPTE, Full	Selects the colour bar type	Install	Sys
Pulse bar	On, **Off**		Install	Sys
Lighting	**Optimal**, Good, Fair, Poor, Extreme	Selects AnyLight anti-flicker type. Only for LDK 4583 High Speed Base Station	Oper	-
Combine	**Field**, 2-line, 4-line	Selects method of combining high-speed phases for the viewing output. Only for LDK 4583 High Speed Base Station	Oper	Scene

5.2.2 Monitoring menu

Menu item	Values	Description	Level	File
Monitoring source	R, G, B, **Y**	Selects signal on monitoring HD output.	Oper	Scene
Menu				
Display	On, **Time**	Selects the menu display to be permanently on (visible) or to disappear after set time.	Oper	Oper
Menu Time	5..99 **(10)**	Sets the length of time the menu is displayed when the Display mode is set to Time.	Oper	Oper
Menu Level	Oper, **Inst**, Serv	Sets the user access level for the menu.	Oper	-
Status bar				
Studio				
Studio	On, **Off**	Shows the studio name in the status bar.	Oper	Oper
Name	<studio name>	Edit the studio name string value.	Oper	-
Operator				
Studio	On, **Off**	Shows the operato's name in the status bar.	Oper	Oper
Name	<studio name>	Edit the operator's name string value.	Oper	-
Camera number	On, **Off**	Shows the camera number in the status bar.	Oper	Oper
Cable length	**Off**, Perc, Length, Atten	Shows the cable length in percentage used, length left or attenuation.	Oper	Oper
HD Out Text				
Warning Y-pos	1..14 **(14)**	Sets the vertical position of the warning text.	Oper	-
CamName Y-pos	1..14 **(1)**	Sets the vertical position of the camera name.	Oper	-

5.2.3 Audio/intercom menu

Menu item			Values	Description	Level	File
Audio						
	Audio Level 1		0dB, **6dB**	Selects studio audio attenuation for analog audio input 1.	Install	Sys
	Audio Level 2		0dB, **6dB**	Selects studio audio attenuation for analog audio input 2.	Install	Sys
Intercom						
	Isolate					
		Source	**Local**, Rmote	Local = settings are available in the base station menu; Rmote = settings are available in the MCP	Oper	Oper
		Isolate	Isol, **Syst**	Isol = Isolate Prog and Prod intercom to camera head with Eng available; Syst = isolate is off	Install	Install
	Eng					
		Wire Mode	2wire, **4wire**	Selects studio intercom wiring mode.	Install	Sys
		Side Tone	0..99 **(50)**	Sets side tone (headset feedback) volume level.	Oper	Oper
		Level	0dB, **6dB**	Selects intercom channel attenuation.	Oper	Oper
		In Ref Level	0..99 **(50)**	Sets input reference level.	Install	Sys
		Out Ref Level	0..99 **(50)**	Sets output reference level.	Install	Oper
	Prod					
		Wire Mode	2wire, **4wire**	Selects studio intercom wiring mode.	Install	Sys
		Side Tone	0..99 **(50)**	Sets side tone (feedback) volume level.	Oper	Oper
		Level	0dB, **6dB**	Selects intercom channel attenuation.	Oper	Oper
		In Ref Level	0..99 **(50)**	Sets input reference level.	Install	Sys
		Out Ref Level	0..99 **(50)**	Sets output reference level.	Install	Oper
	Prog					
		Wire Mode	2wire, **4wire**	Selects studio intercom wiring mode.	Install	Sys
		Level	0dB, **6dB**	Selects intercom channel attenuation.	Oper	Oper
		In Ref Level	0..99 **(50)**	Sets input reference level.	Install	Sys
	Eng Headset					
		Phantom Power	On, **Off**	Turns microphone phantom power (+12 VDC) on or off.	Oper	Oper
		Mic Level	0dB, **20dB**	Sets headset microphone sensitivity level.	Oper	Oper
		Side Tone	0..99 **(50)**	Sets headset side tone (feedback) level.	Oper	Oper
		Mic to Headset	**On**, Off	Turns headset side tone on or off.	Oper	Oper
		Cam to Headset	**On**, Off	Turns camera ENG channel to headset routing on or off.	Oper	Oper
		Cam Volume	0..99 **(50)**	Sets camera ENG channel to headset level.	Oper	Oper
		Tracker to Headset	**On**, Off	Tracker ENG channel to headset.	Oper	Oper

Menu item		Values	Description	Level	File
	Tracker Volume	0..99 **(50)**	Sets tracker Eng channel to headset level.	Oper	Oper
	Mic Eng-Out	**On**, Off	Headset to base station Eng output	Oper	Oper
	Mic to Eng-Cam	**On**, Off	Headset to camera Eng channel	Oper	Oper
Call		**Call**, Voice	Selects action for the Call function.	Oper	Oper
Voice Mail					
	Record Eng	**On**, Off	When turned on, intercom messages from the Eng channel are recorded.	Oper	Oper
	Record Prod	**On**, Off	When turned on, intercom messages from the Prod channel are recorded.	Oper	Oper
	Record Prog	**On**, Off	When turned on, intercom messages from the Progchannel are recorded.	Oper	Oper

5.2.4 SDTV menu

Menu item		Values	Description	Level	File
Contour					
	Contour	**On**, Off	Turns contour on or off.	Oper	Scene
	Source	G, R, **Y**, R+G	Selects the source to be used for contour generation.	Oper	Scene
	Level	0..99 **(10)**	Sets contour level.	Oper	Scene
	Vertical Level	0..99 **(50)**	Sets the level of the vertical component in the contour signal.	Oper	Scene
	Noise Slicer	0..99 **(6)**	Sets the level of the noise slicer.	Oper	Scene
	Coarse/Fine	0..99 **(25)**	Sets the coarseness of the contour (0 = very fine)	Oper	Scene
	Level Dependence	0..99 **(25)**	Sets the dependency level for the noise slicer.	Oper	Scene
	Soft Contour	**On**, Off	Turns soft contour on or off. This function reduces the amount of contour added for large transitions.	Oper	Scene
	Soft Contour Level	0..99 **(70)**	Sets the upper limit level for soft contour.	Oper	Scene
Aspect Ratio		**16:9**, 4:3	Selects aspect ratio for SD signal.	Install	
Letterbox		**Off**, 16:9	Selects letterbox function (only when aspect ratio = 4:3)	Install	

5.2.5 System menu

Menu item	Values	Description	Level	File
Camera Number	1..99 (**99**)	Selects the camera number.	Oper	
IP Address				
IP Config Mode	Man, **Auto**	Selects manual or automatic IP configuration mode.	Oper	
BS IP digit 1	1..250 **(69)**	Select IP address digit 1 (for manual IP configuration mode.)	Oper	
BS IP digit 2	0..255 (**254**)	Select IP address digit 2 (for manual IP configuration mode.)	Oper	
BS IP digit 3	0..255 (**1**)	Select IP address digit 3 (for manual IP configuration mode.)	Oper	
BS IP digit 4	1..254 (**1**)	Select IP address digit 4 (for manual IP configuration mode.)	Oper	
CAM IP digit 1	1..250 **(69)**	Select IP address digit 1 (for manual IP configuration mode.)	Oper	
CAM IP digit 2	0..255 (**254**)	Select IP address digit 2 (for manual IP configuration mode.)	Oper	
CAM IP digit 3	0..255 (**1**)	Select IP address digit 3 (for manual IP configuration mode.)	Oper	
CAM IP digit 4	1..254 (**1**)	Select IP address digit 4 (for manual IP configuration mode.)	Oper	
Subnet Mask	0..31 (**24**)	Select the subnet mask value (for manual IP configuration mode.)	Oper	
Apply IP Settings	**exec** > busy > exec	Select Exec to apply the new manually set IP settings.	Oper	
Ethernet				
Ethernet Speed	100Mb, **10Mb**, Auto	Selects the Ethernet network speed.	Install	
Ethernet Duplex	Full, Half, **Auto**	Selects the Ethernet duplex mode.	Install	
Camera power	**On**, Off	Turns the power the camera on or off	Oper	Oper
No Signal	**Col.Bar**, Black	Selects the type of video signal the base station generates when no camera signal is present/detected: Col.Bar = Colour bar is generated Black = Black video signal is generated	Oper	-
AFD-setting	4:3 (Center), **16:9 (Full)**			
Signalling inputs				
Yellow On Air	**Standard**, Independent	Standard: use to switch off the yellow On Air signal (ISO) when a red On Air tally signal is active. Independent: use to leave the yellow On Air signal (ISO) unchanged when a red On Air tally signal is active.	Oper	
Yellow On/Off	**Low/High**, High/Low, Open/High, High/Open	Selects switching behaviour for the yellow On Air (ISO) signalling inputs.	Oper	
On Air On/Off	**Low/High**, High/Low, Open/High, High/Open	Selects switching behaviour for the red On Air (Tally) signalling inputs.	Oper	

Menu item	Values	Description	Level	File
Timing				
H Phase Coarse	0..99 (**50**)	Sets the horizontal phase of the video signals (coarse).	Oper	Sys
H Phase Fine	0..99 (**50**)	Sets the horizontal phase of the video signals (fine).	Oper	Sys
Clock				
Day	1..31	Selects value for day.	Install	
Month	January .. December	Selects value for month.	Install	
Year	0..99	Selects value for year.	Install	
Hour	0..23	Selects value for hour.	Install	
Minute	0..59	Selects value for minute.	Install	
Video Mode	<all available video modes>	Selects a video mode for the Base Station test signal when no camera is connected. Note: when a camera is connected, the Base Station automatically identifies and switches to the video mode of the camera.	Install	

5.2.6 Files menu

Menu item		Values	Description	Level	File
User Operator Files					
	Operator File	**O_BS1**, O_BS2, O_BS3, O_BS4	Selects Operator file to use.	Oper	
	Recall	**exec** > run > exec	Recalls selected Operator file.	Oper	
	Store	**exec** > run > exec	Stores selected Operator file.	Install	
User System Files					
	System File	**S_BS1**, S_BS2, S_BS3, S_BS4	Selects System file to use.	Install	
	Recall	**exec** > run > exec	Recalls selected System file.	Install	
	Store	**exec** > run > exec	Stores selected System file.	Install	
Std. System Files					
	System File	**Cust**, Fact	Selects standard system file to use: Cust(omer) or Fact(ory).	Install	
	Recall	**exec** > run > exec	Recalls selected standard system file.	Install	
	Store	**exec** > run > exec	Stores selected standard system file.	Install	

5.2.7 Diagnostics menu

Menu item			Values	Description	Level	File
Board ID						
	Data Board		<12nc>, <status>,<date>	Shows 12nc, status and production date.	Oper	
	Sync/Enc Board		<12nc>, <status>,<date>	Shows 12nc, status and production date.	Oper	
	Digital Output Board		<12nc>, <status>,<date>	Shows 12nc, status and production date.	Oper	
	HQ SDTV Output Board		<12nc>, <status>,<date>	Shows 12nc, status and production date.	Oper	
	Fiber Transm. Board		<12nc>, <status>,<date>	Shows 12nc, status and production date.	Oper	
	Optical Connect Board		<12nc>, <status>,<date>	Shows 12nc, status and production date.	Oper	
	Power Board		<12nc>, <status>,<date>	Shows 12nc, status and production date.	Oper	
	Power Fiber Board		<12nc>, <status>,<date>	Shows 12nc, status and production date.	Oper	
	Local Power Board		<12nc>, <status>,<date>	Shows 12nc, status and production date.	Oper	
	Ext Video Input Board		<12nc>, <status>,<date>	Shows 12nc, status and production date.	Oper	
	BNC Connector Board		<12nc>, <status>,<date>	Shows 12nc, status and production date.	Oper	
	DSC Interf Board		<12nc>, <status>,<date>	Shows 12nc, status and production date.	Oper	
	Audio/Intercom Board		<12nc>, <status>,<date>	Shows 12nc, status and production date.	Oper	
	ENG Headset Board		<12nc>, <status>,<date>	Shows 12nc, status and production date.	Oper	
Board Diagnostics						
	Power Board					
		Triax Status	DCPWR, **TSHRT**, ACPWR, COPEN, SOPEN, CSHRT, NOCAM, ERROR, OVRLD, ACODC, PWOFF, UKNOW	Refer to the Diagnostics section in this user's guide for a description of the Triax Status.	Oper	
		Fiber Status	CAMON, TSHRT, POPEN, SOPEN, PSHRT, NOCAM, ERROR, OVRLD, PWOFF, UKNOW	Refer to the Diagnostics section in this user's guide for a description of the Fiber Status.	Oper	
		Local Power Status	**Ok**, NotOK	Shows status of the power board.	Oper	
		Power Overheated	Yes, **No**		Oper	
		Fan	**Ok**, NotOK	Status of the internal cooling fan.	Oper	
	Sync/Encoder Board					
		Reference Available	**None**, SDTV, HDTV		Oper	
		Burst Lock	Yes, **No**		Oper	
		Sync Lock	Yes, **No**		Oper	
		Ext1 Input	**None**, HDSDI, SDI	Selects input type for External video input 1	Oper	
		Ext2 Input	**None**, HDSDI, SDI	Selects input type for External video input 2	Oper	
	Data Board					
		Firmware Status	<status>	Firmware Status	Oper	
		Boot Software Id	<id>	Boot Software Id	Oper	
		Base Station 12NC	<12nc>	Base Station 12NC	Oper	

Menu item	Values	Description	Level	File
Base Station Status	<status>	Base Station Status	Oper	
Eth MAC	<MAC address>	Shows the Ethernet MAC address of the network adapter.	Oper	
Eth Link Type	**Unknown**, 10Mb/Half, 10Mb/Full, 100Mb/Half, 100Mb/Full	Shows the Ethernet link type for the C2IP network.	Oper	
Audio/Intercom Board				
Self test	**exec** > run	Select exec to run the diagnostic self test.	Oper	
ENG Test Tone Intern	**run** > ok (error)		Oper	
PROD Test Tone Intern	**run** > ok (error)		Oper	
PROG Test Tone Intern	**run** > ok (error)		Oper	
ENG Test Tone Studio	**run** > ok (error)		Oper	
PROD Test Tone Studio	**run** > ok (error)		Oper	
ENG Headset Board				
Self test	**exec** > run	Select exec to run the diagnostic self test.	Oper	
Test Intern	**run** > ok (error)		Oper	
Test Studio	**run** > ok (error)		Oper	
Test Tome Mic.BS	On, **Off**		Oper	
Test Tone Tr/Flr.Mic	On, **Off**		Oper	
Test Tone Cam.Mic	On, **Off**		Oper	
Ext Video Input Board				
Carrier Eq Ext1	**Yes**, No		Oper	
Carrier Rcve Ext1	**Yes**, No		Oper	
SDI Lock Ext1	**Yes**, No		Oper	
SDI TV system Ext1	**625**. 525		Oper	
Carrier Eq Ext2	**Yes**, No		Oper	
Carrier Rcve Ext2	**Yes**, No		Oper	
SDI Lock Ext2	**Yes**, No		Oper	
SDI TV system Ext2	**625**. 525		Oper	
BS TV system	**PAL**, NTSC		Oper	
Transmission Diag.				
CAM->BS				
Fiber Signal Status	**OK**, Critic, Error, NoSig	Displays signal status of the fiber connection from the camera to the base station: OK = Fiber transmission is OK Critic = Signal level is critical but transmission will continue. Error = Signal level is too low and transmission is not guaranteed. NoSig = No signal detected	Oper	

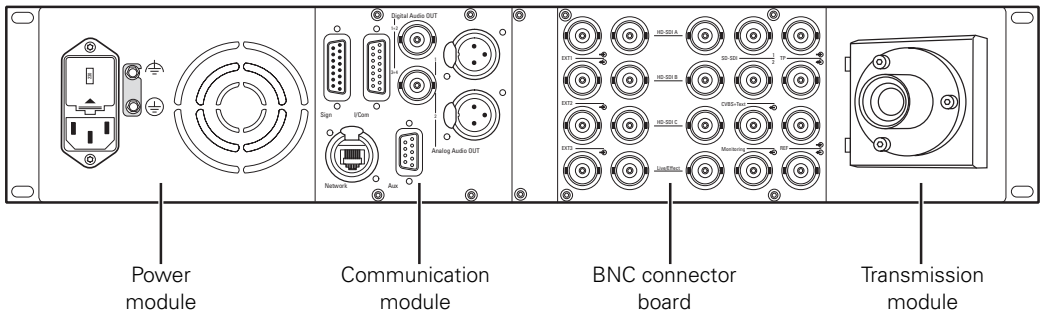
Menu item		Values	Description	Level	File
	Opt. RX Margin (dB)	0..65535	Displays optical margin (in dB) for the fiber connection from base station to the camera.	Oper	
	BS->CAM				
	Fiber Signal Status	OK, Critic, Error, **NoSig**	Displays signal status of the fiber connection from the base station to the camera: OK = Fiber transmission is OK Critic = Signal level is critical but transmission will continue. Error = Signal level is too low and transmission is not guaranteed. NoSig = No signal detected	Oper	
	Opt. RX Margin (dB)	0..65535	Displays optical margin (in dB) for the fiber connection from base station to the camera.	Oper	
	Transmission System	Triax, Mobox, Fib_A, Fib_D, Unkno, **FibHS**	Displays the transmission system in use.	Oper	
Communications Diag.					
	Camera Connected	Yes, **No**		Oper	
	C2IP panels	0..10 **(0)**		Oper	

Chapter 6

Connectors

6.1 Base Station connectors

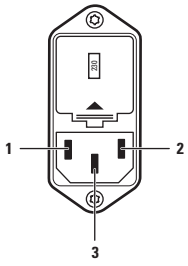
Figure 6-1. Base Station connector location



Caution
Do not allow system earth currents to exceed 0.2 A in any cable shields.

6.1.1 Power module

Mains power connector



IEC style 3-pin male

Pin	Description
1	Neutral
2	Line
3	Earth

Mains input voltage:
230 VAC or 115 VAC

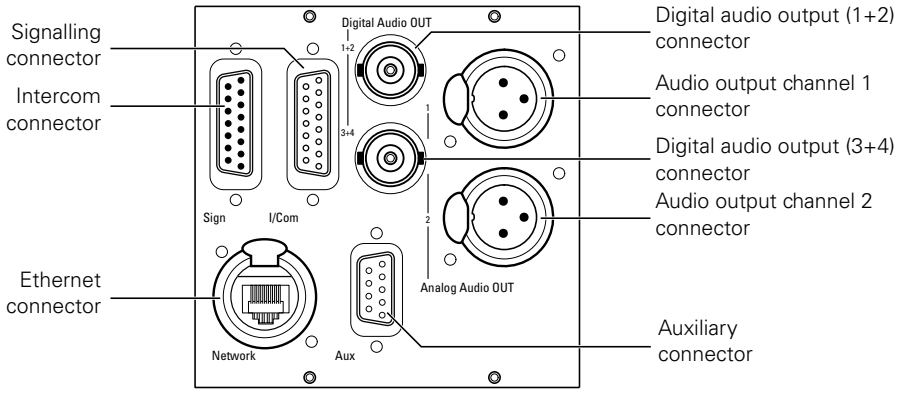
Fuses:
4AT (230 VAC) or 10AT (115 VAC)

Mains frequency:
47 to 63 Hz

Power consumption:
270 Watt (470 VA)

6.1.2 Communication module

Connector locations



Digital audio output (1+2) connector

BNC connector

BNC connector, 2-channel AES/EBU compliant audio output, 1.0 Vpp, 75 Ω

This connector carries the digital audio signal applied to the digital audio input at the camera adaptor.

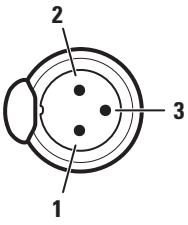
Digital audio output (3+4) connector

BNC connector

BNC connector, 2-channel AES/EBU compliant audio output, 1.0 Vpp, 75 Ω

This connector carries the digitally converted Audio channel 1 and 2 from the camera's Mic 1 and Mic 2 connectors.

Audio output (1 & 2) connectors



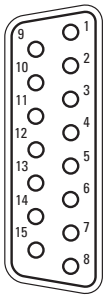
XLR 3-pin male

Pin	Description
1	Audio shield
2	Audio Out
3	Audio Return

Sensitivity range: -64 dBu to -22 dBu

Signal at pin 2 of audio output is in phase with signal at pin 2 of audio input.

Intercom connector



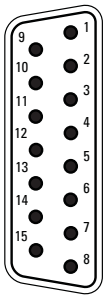
SubD 15-pin male

Pin	Description
1	Prod out (4-wire out, 2-wire in/out)
2	Prod in (4-wire only)
3	Prod in shield (4-wire only)
4	Eng in (4-wire only)
5	Eng out (4-wire out, 2-wire in/out)
6	Prog in (4-wire only)
7	Prog in shield (4-wire only)

Pin	Description
8	Housing
9	Prod out return (4-wire out, 2-wire in/out)
10	Prod in return (4-wire only)
11	Eng in shield (4-wire only)
12	Eng in return (4-wire only)
13	Eng out return (4-wire out, 2-wire in/out)
14	Prog in return (4-wire only)
15	Housing

Shield of cable to the pin marked housing.

Signalling connector



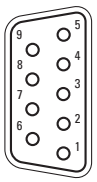
SubD 15-pin male

Pin	Description
1	Preview output ext. (relay contact < 10 Ω)
2	Call output ext. (relay contact < 10 Ω)
3	ISO input ext. (dry contact)
4	On Air input ext. (dry contact)
5	Call input ext. (dry contact)
6	Audio 1 level (analog input voltage 0 to +5 VDC)
7	+5 VDC; OCP 400

Pin	Description
8	Housing
9	Preview output ext. return
10	Call output ext. return
11	ISO input ext. return
12	On Air input ext. return
13	Call input ext. return
14	Audio 2 level (see pin 6)
15	GND

Microphone impedance >200 Ω
Sensitivity range: -70 to -28 dBm
Signal at pin 2 of audio input is in phase with signal at pin 2 of the audio output.
Shield of cable to the pin marked housing.

Auxiliary connector

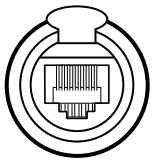


SubD 9-pin female connector

Pin	Description
1	+5 VDC
2	AN 0 (0 to +5 VDC input)
3	Private data out
4	Private data in
5	Housing (attach cable shield to this pin)
6	GND
7	AN 1 (0 to +5 VDC input)
8	Private data out return
9	Private data in return

Shield of cable directly to the connector housing.

Ethernet connector



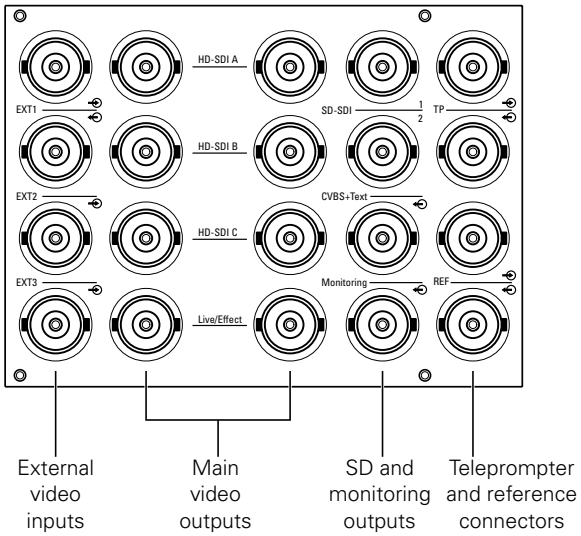
8-pin standard RJ-45 ethernet connector

Pin	Description
1	TX+
2	TX-
3	RX+
4	no connection
5	no connection
6	RX-
7	no connection
8	no connection

10Base-T, 100Base-TX compliant with IEEE-802.3 (edition 2000)

6.1.3 BNC connector board

Figure 6-2. BNC connectors



External video inputs

Connector	Signal or function
External 1 in	External 1 input signal (SD-SDI or HD-SDI)
External 1 out	External 1 active loop-through output
External 2 in	External 2 input signal (SD-SDI or HD-SDI)
External 2 out	External 2 (looped-through signal)

☞ Note

Make sure that the applied external video inputs match the format (720p/1080i) and temporal frequency (50 or 59.94 Hz) of the selected camera video mode.

Main video outputs

Connector	Signal or function
HD-SDI A (2x)	2x BNC HD-SDI video output
HD-SDI B (2x)	2x BNC HD-SDI video output
HD-SDI C (2x)	2x BNC HD-SDI video output
Live/Effect (2x)	2x BNC HD-SDI video output

Video output signals

The video signals present on the main video outputs are depending on the selected video mode of the connected camera:

Camera video mode	HD-SDI A connector	HD-SDI B connector	HD-SDI C connector	Live/Effect connector
1080i50/59	1080i50/59.94 SMPTE 292M, @ 1.5 Gbit/s + embedded audio	1080i50/59.94 SMPTE 292M, @ 1.5 Gbit/s	1080i50/59.94 SMPTE 292M, @ 1.5 Gbit/s	1080i50/59.94 SMPTE 292M, @ 1.5 Gbit/s + embedded audio
1080i100/119 (2-speed)	1080i50/59.94 **< phase 1 >** SMPTE 292M, @ 1.5 Gbit/s + embedded audio	1080i50/59.94 **< phase 2 >** SMPTE 292M, @ 1.5 Gbit/s	1080i50/59.94 **< combined >** SMPTE 292M, @ 1.5 Gbit/s	1080i50/59.94 **< combined >** SMPTE 292M, @ 1.5 Gbit/s + embedded audio
1080i150/179 (3-speed)	1080i50/59.94 **< phase 1 >** SMPTE 292M, @ 1.5 Gbit/s + embedded audio	1080i50/59.94 **< phase 2 >** SMPTE 292M, @ 1.5 Gbit/s	1080i50/59.94 **< phase 3 >** SMPTE 292M, @ 1.5 Gbit/s	1080i50/59.94 **< combined >** SMPTE 292M, @ 1.5 Gbit/s + embedded audio
720p50/59	720p50/59.94 SMPTE 292M, @ 1.5 Gbit/s + embedded audio	720p50/59.94 SMPTE 292M, @ 1.5 Gbit/s	720p50/59.94 SMPTE 292M, @ 1.5 Gbit/s	720p50/59.94 SMPTE 292M, @ 1.5 Gbit/s + embedded audio
720p100/119 (2-speed)	720p50/59.94 **< phase 1 >** SMPTE 292M, @ 1.5 Gbit + embedded audio	720p50/59.94 **< phase 2 >** SMPTE 292M, @ 1.5 Gbit/s	720p50/59.94 **< combined >** SMPTE 292M, @ 1.5 Gbit/s	720p50/59.94 **< combined >** SMPTE 292M, @ 1.5 Gbit/s + embedded audio
720p150/179 (3-speed)	720p50/59.94 **< phase 1 >** SMPTE 292M, @ 1.5 Gbit/s + embedded audio	720p50/59.94 **< phase 2 >** SMPTE 292M, @ 1.5 Gbit/s	720p50/59.94 **< phase 3 >** SMPTE 292M, @ 1.5 Gbit/s	720p50/59.94 **< combined >** SMPTE 292M, @ 1.5 Gbit/s + embedded audio

SD and monitoring outputs

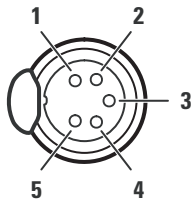
Connector	Signal or function
SD-SDI-1	SDTV output signal 1 (only available with optional LDK 4531/30 HQ SD board)
SD-SDI-2	SDTV output signal 2 (only available with optional LDK 4531/30 HQ SD board)
CVBS+Text	CVBS + menu text output signal (analog SD-signal)
Monitoring	HD-SDI Monitoring output signal with Menu text.

Teleprompter and reference connectors

Connector	Signal or function
TP-in	Teleprompter input signal (SD analog video signal)
TP-out	Teleprompter looped-through (output) signal
REF-in	Reference input signal (HD Trilevel sync or SD Black Burst)
REF-out	Reference looped-through (output) signal

6.1.4 LDK 4541/10 Engineering intercom module (option)

Headset connector (front side)



XLR 5-pin female

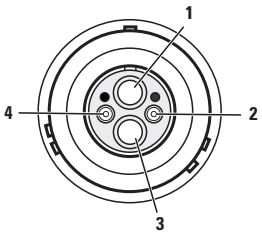
Pin	Description
1	Microphone return
2	Microphone
3	Telephone return
4	Telephone left
5	Telephone right

Microphone level -64 dBu
Microphone impedance 200 Ω
Telephone level +6dBm nominal
Telephone output impedance < 50 Ω

Shield of cable directly to the connector housing.

6.1.5 Transmission module

Hybrid fiber connector

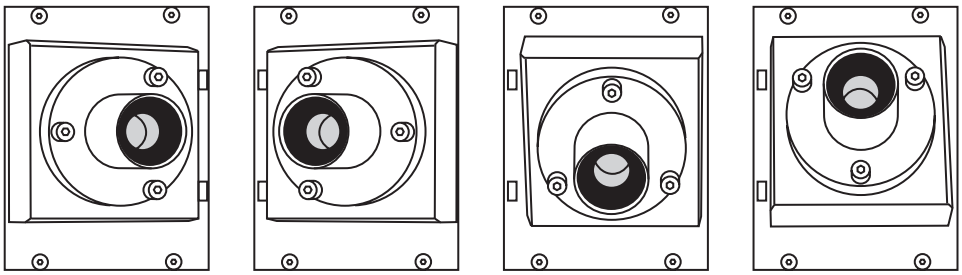


Pin	Description
1	Optic fiber channel A
2	Power supply return
3	Optic fiber channel B
4	Power supply

LEMO Hybrid Fiber connector compliant with SMPTE 304M.

Various types of Hybrid fiber connector are available by request

The transmission connector can be mounted to suit your cable run.



Chapter 7

Specifications

7.1 Specifications for the LDK 4583

Item	Value
General	
Dimensions (W x H x D)	438 x 88 x 510 mm (17.2 x 3.5 x 20.1 in)
Weight (approx.)	17 kg (37.5 lbs) fully equipped
Operating temperatures	0 to +45 °C (+32 to +113 °F)
Storage temperatures	-40 to +70 °C (-40 to +158 °F)
Operating humidity	max. 90% relative humidity (non condensing)
Power	
Power requirements	115 VAC / 230 VAC +/- 15%, 47 to 63Hz
Power consumption	270 W (470 VA) max. fully equipped
Power connection	IEC type, 3-pin male
Transmission (Fiber)	
Hybrid fiber connector	LEMO type, other types by request compliant with SMPTE 304M.
Typical cable length	4,000 m (13,000 ft) using SMPTE311M hybrid fiber cable
Bandwidth	30/15/15 MHz, Y/Cr/Cb
Video inputs	
Teleprompter	BNC (loop-through), 1.0 Vpp, 75 Ω
Reference	BNC (loop-through), 1.0 Vpp, 75 Ω HD tri-level sync or SD Black Burst
Video outputs	
HD-SDI	3x BNC, 0.8 Vpp, 75 Ω, SMPTE 292M, 1080i or 720p at 59.94 or 50Hz
Text out	BNC, 1.0 Vpp, 75 Ω VBS (monochrome)
Composite video	BNC, 1.0 Vpp, 75 Ω CVBS (for viewing purposes)
Digital audio	
Audio out	2x BNC, 2 x 2 channels AES/EBU compliant, 1.0 Vpp, 75 Ω

Item	Value
Analog audio	
Audio out	2 x XLR-3, 0/+6 dBu (+/-1.5 dB, max. 18 dBu, 600 Ω, max. gain 70 dB)
Frequency response	40 Hz to 15 kHz, (+1/-3 dB, 1 kHz, -10 dBu output level)
Distortion	< 0.5% (100 Hz / 1 kHz, +6 dBu output level, 600 Ω)
S/N ratio	58 dB (unweighted RMS)
Intercom	
Intercom in/out	D-sub 15-pin, female (Program in, Production in/out, Engineering in/out)
Input	0 or 6 dBu (max. 6 or 12 dBu), 9 kΩ
Output	0 or 6 dBu (+/ -2dB, max 12 dBu), 600 Ω
Frequency response	150 Hz to 6 kHz (1 kHz, -10 dBu output level)
Distortion	< 2% (1 kHz, +12 dBu output level)
External and control connections	
C2IP camera control	Ethernet RJ-45 connector
Signalling in/out	D-sub 15-pin, male
Auxiliary in/out	D-sub 9-pin, female

7.2 Specifications for optional modules

Item	Value
LDK 4531/30 High quality digital SDTV output module	3x BNC SD-SDI output, 0.8 Vpp, 75 Ω, SMPTE 259M Frequency response: 0.1 to 5.75 MHz (+0.5 dB/-1 dB) K-factor less than 2%
LDK 4541/10 2-channel XLR-5 engineering intercom module	Audio in/out XLR-5 connector 6 dBu, +/- 2 dB, max 12 dBu, 25 to 400 Ω Frequency response: 150 Hz to 6 kHz, +/- 3 dB (0 dB, 1 kHz, -10 dBu output level) S/N ratio: 46 dB (unweighted RMS) Phantom power +12 VDC (+/ -1 VDC), menu selectable
LDK 4560/20 Monitoring HD module	PXM video out BNC 1x 1.0 Vpp, 75 Ω, SMPTE 274M or SMPTE 296M (depending on acquisition format); R, G, B or Y (menu selection) with HD tri-level Sync. WFM video out BNC, 1.0 Vpp, 75 Ω, SMPTE 274M or SMPTE 296M (depending on acquisition format); R, G, B or Y (menu selection) with HD tri-level sync. Analog HD out VGA-type D-connector, 15-pin, female, with R, G, B, H-sync and V-sync Frequency response 0.1 to 30 MHz (+0.5 dB/- 1 dB)

7.3 Dimensions

Figure 7-1. Dimensions